

WIRED

July 1996

Bruce Sterling:
Art as War

Aum:
Cult at
the End of
the World

Avram Miller:
Intel and
Hollywood

Alvin Toffler:
Heresies '96

KIDS CYBER RIGHTS

The left and the right are both exploiting children for their own political ends. To protect itself, even the digital community is pushing censorware at kids. But as Jon Katz argues, kids have rights too – including the right to access the culture they are creating.



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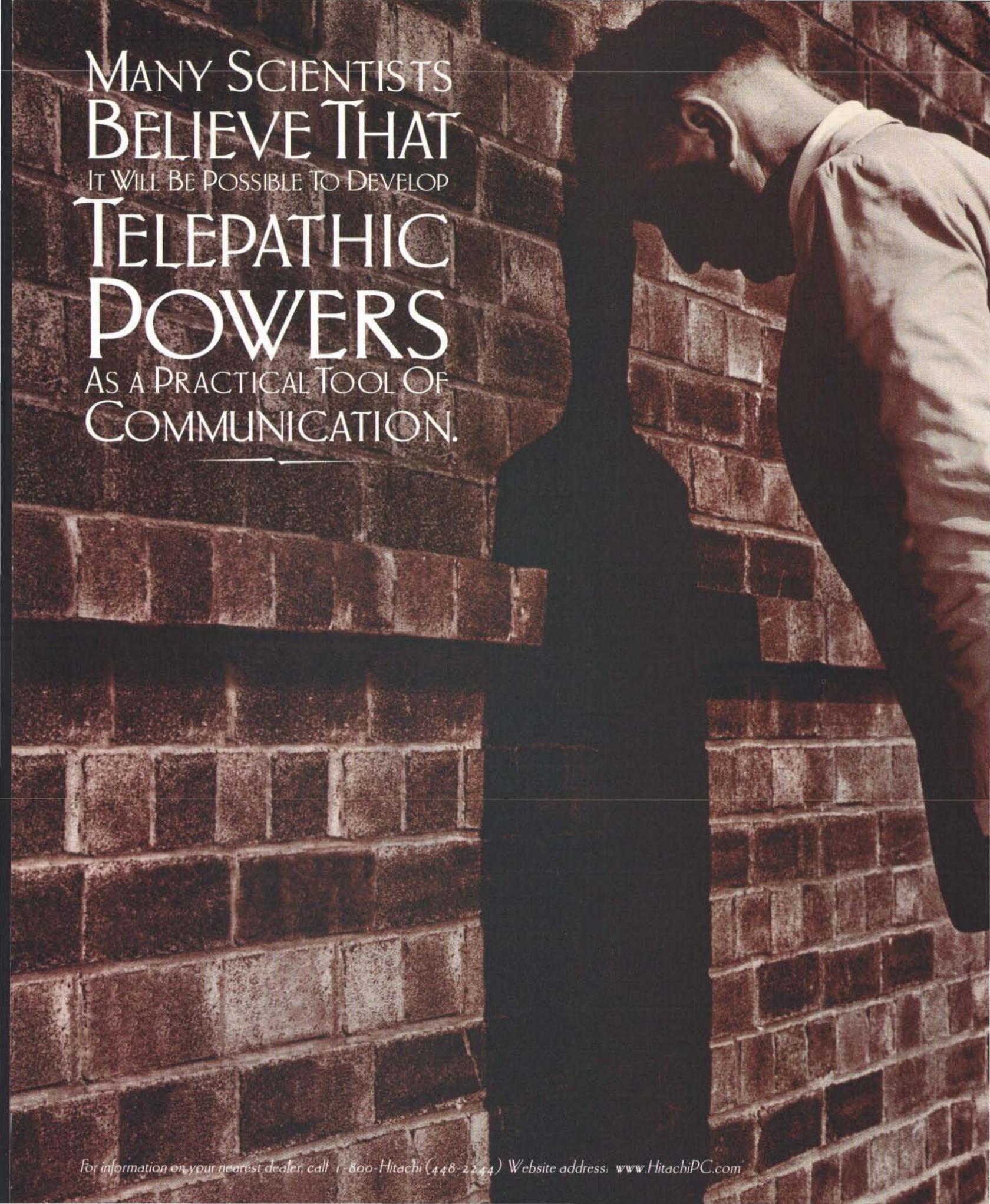
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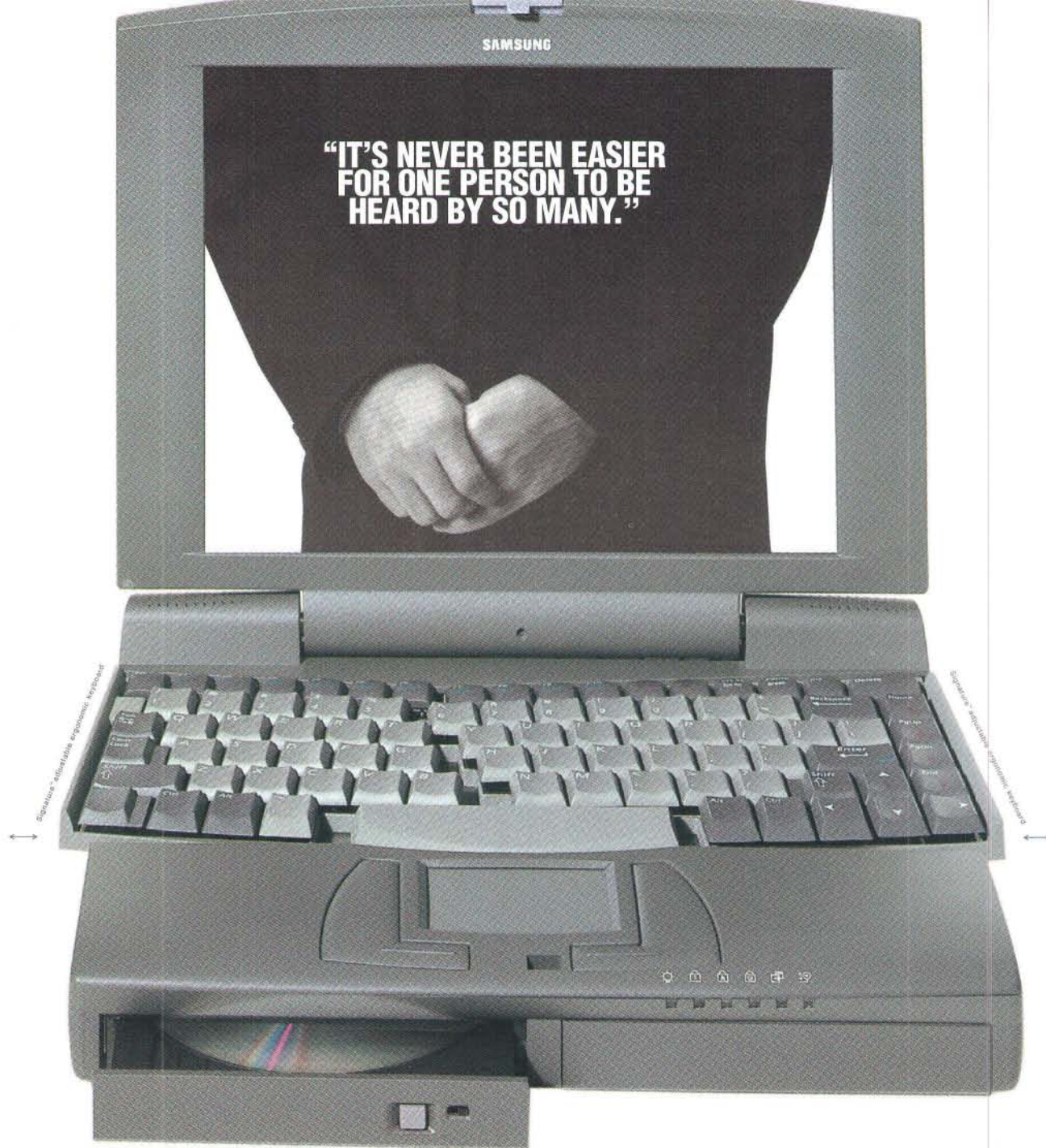


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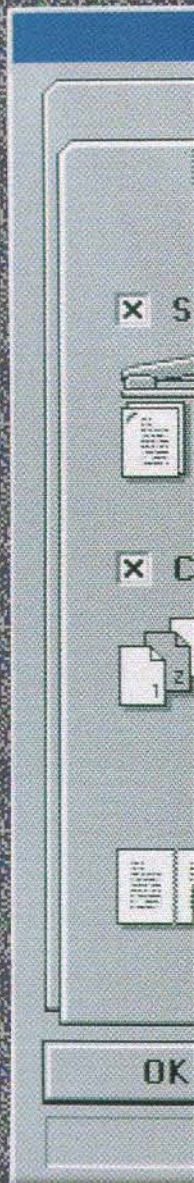
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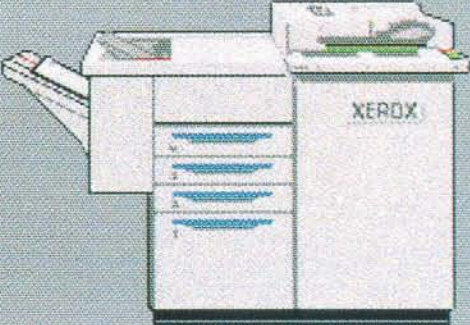
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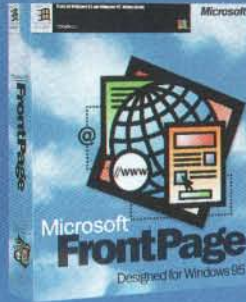


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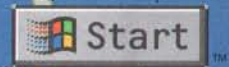
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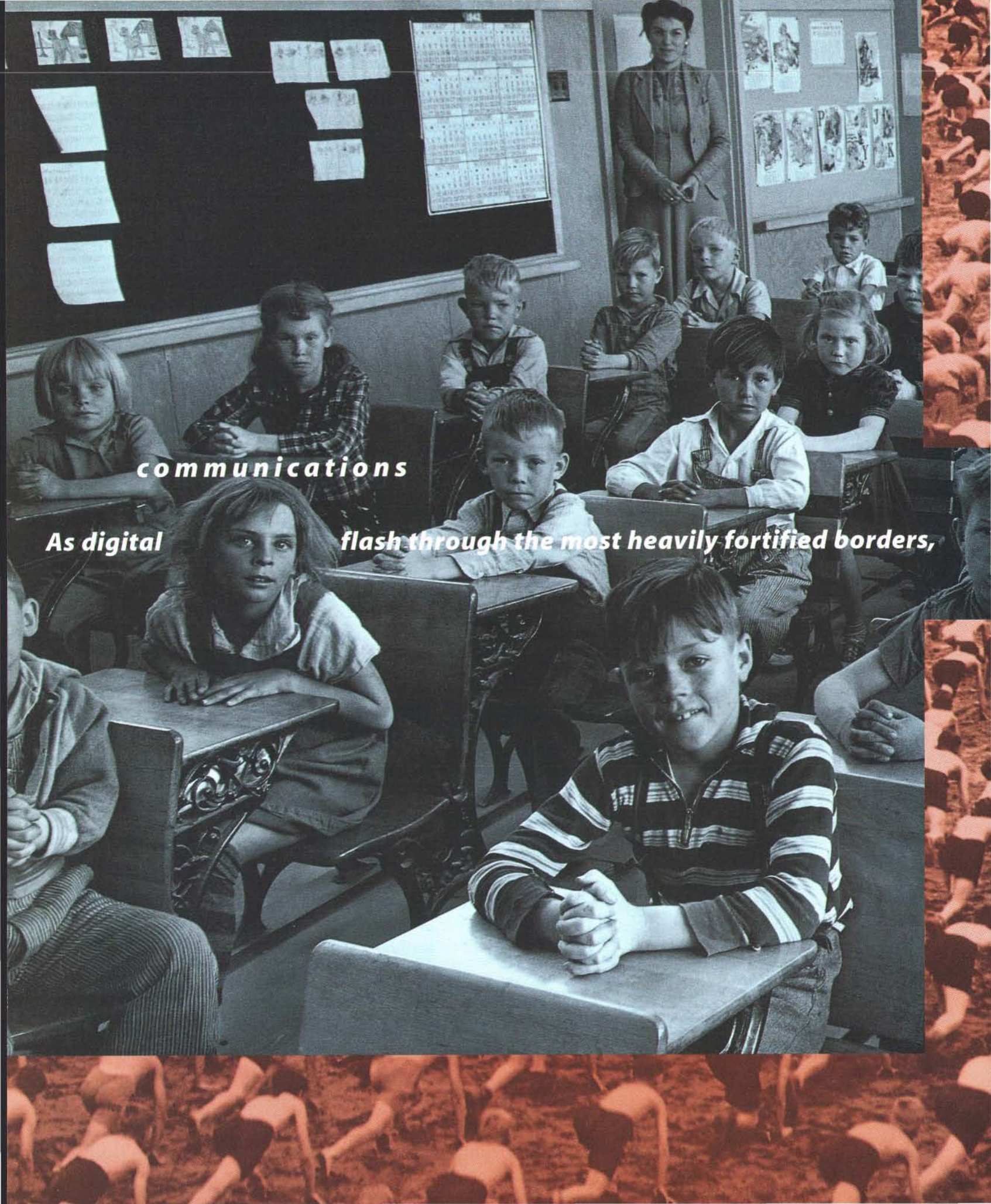
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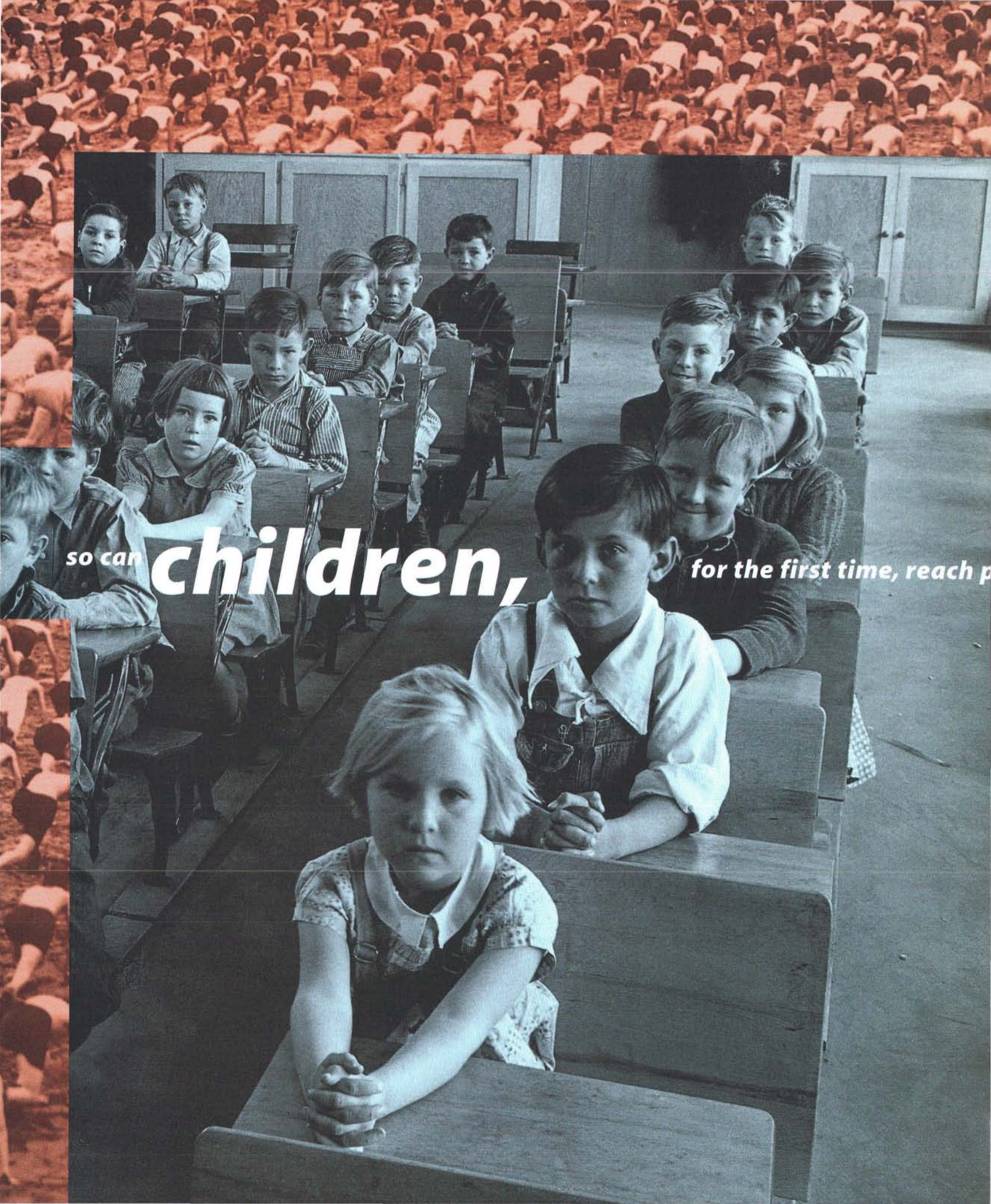
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communications

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so can **children,** for the first time, reach p

A photograph of a group of young people running outdoors. The scene is bathed in a warm, golden light, suggesting late afternoon or early morning. The runners are in motion, with some wearing dark athletic wear and others in lighter clothing. The background is blurred, emphasizing the movement and energy of the group.

past the suffocating boundaries of social convention, past their elders' rigid

nor will the rest of us.

notions of what is good for them.



Children will never be the same;

– Jon Katz, page 120

Context

- 26 **Rants & Raves** Reader feedback
- 35 **Electric Word** Bulletins from the front line of the Digital Revolution
- 51 **Fetish** Technolust
- 61 **Scans** People, companies, and ideas that matter
- 68 **Reality Check** The future of bathrooms
- 70 **Raw Data** Stats 'R' Us
- 72 **Geek Page** Digital video discs
- 74 **Follow the Money** Bargains and blowoffs
- 76 **Deductible Junkets** The silicon circuit
- 78 **Update** RSA's globe-trotting Jim Bidzos, Magnet Interactive, Synaptics....
- 80 **Cyber Rights Now** Congress's Internet caucus, Social Security's inside job....

ELECTROSPHERE

- 82 **Computer Insect** By Sang Ye
- 90 **To Surf and Protect** By Rogier van Bakel

IDÉES FORTES

- 101 **Daily Planet** By Mike Godwin
- 102 **Ghosts in the Machine** By Katie Hafner

- 139 **Street Cred**
- 143 **Just Outta Beta**
- 151 **Net Surf**
- 188 **Nicholas Negroponte**

Cover: photographed by Thomas Heinser, June 1996, San Francisco.
 Introduction: kids at desks: Culver Pictures; calisthenics: UPI/Corbis-Bettmann; kids running:
 Minori Kawana/Photonica; kid at computer: Stephen Simpson/FPG International.
 This page: Alex Webb/Magnum.



45

The Netizen: Anticipatory Democracy

Alvin Toffler on American Chechnyas, how Newt blew it, why we still need a new Constitution, direct allocation of income taxes through checkoffs, the Japanese Diet having a seat in Congress, and other observations and heresies. By Kevin Kelly



106

Is Phoenix Burning?

The perils of Mark Pauline – Bruce Sterling on the road with SRL's theater of mechanical cruelty.



112

Diva

With a traditional camera, a Power Mac, 500-plus megs of RAM, and a taste for technodivas, Yukinori Tokoro looks into the soul of his high-res fantasy world. By John S. Couch



114

They Render unto Bill

How Microsoft plucked the world's most renowned 3-D graphics pioneers to shape the future of all things visual. By Charles Platt



118

Un-Still

Corinna Holthusen leaps beyond the singular shots of classical photography to capture multitudes in her still lifes. By Tessa Rumsey



120

The Rights of Kids in the Digital Age

The left and right are both cynically exploiting children to advance their own ideological agendas. Meanwhile, the digital community is all too ready to sell out children to safeguard the rights of adults. By Jon Katz



124

Fill My Bandwidth, Baby

Avram Miller turns to Hollywood to help keep Intel's chip factories humming. By Russ Mitchell



126

The Teachings of Bob Stein

The cyberlord of Voyager is either the most far-out digital publishing visionary in the world or the least effective businessman alive – or both. By Amy Virshup



132

From Bauhaus to Koolhaas

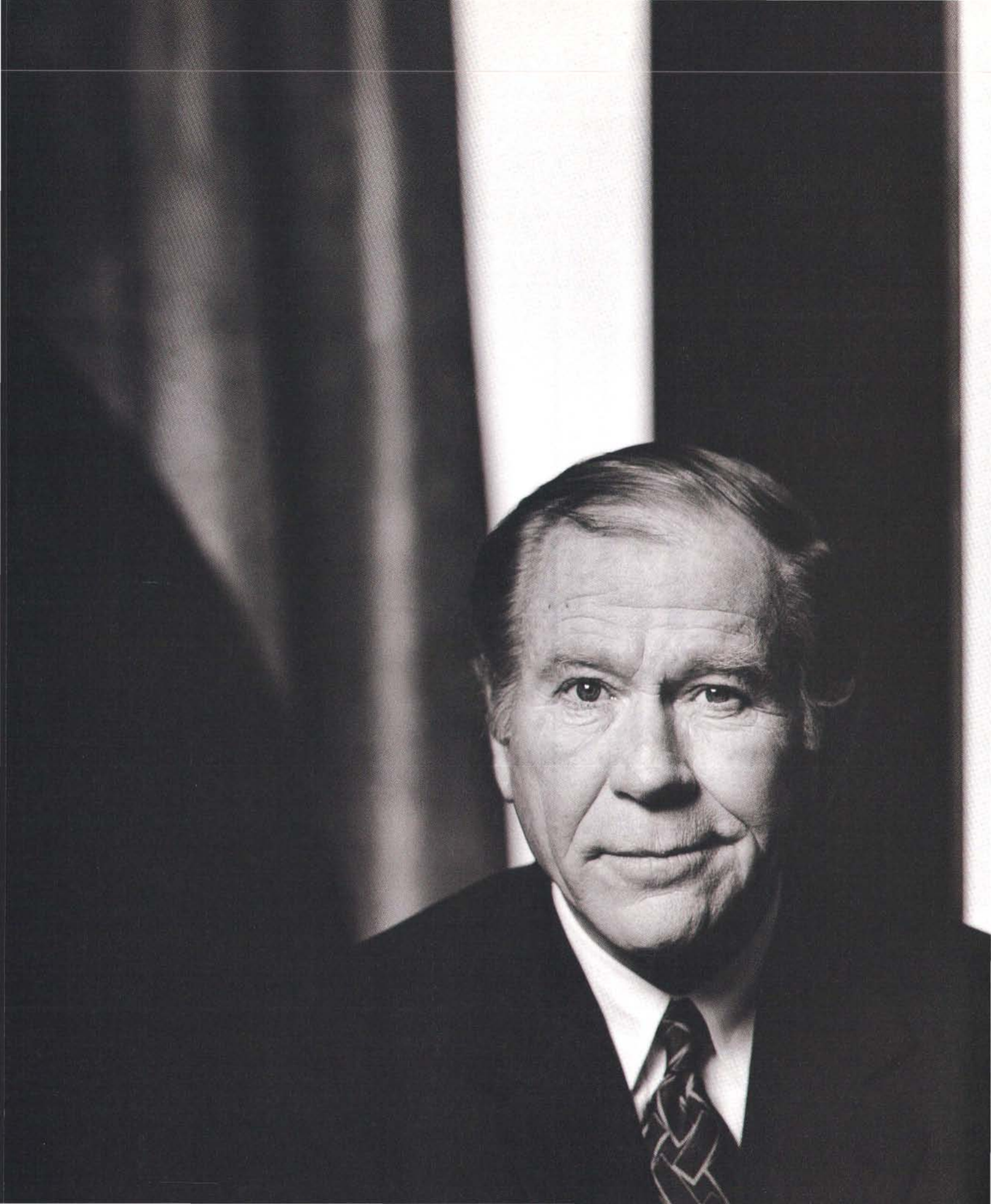
What it takes to make architecture real in the next century. By Katrina Heron



134

The Cult at the End of the World

They were 40,000 strong. Science fiction was their bible. They had weapons of mass destruction – and they wanted to kill the human race. This is the terrifying story of Aum. By David E. Kaplan and Andrew Marshall



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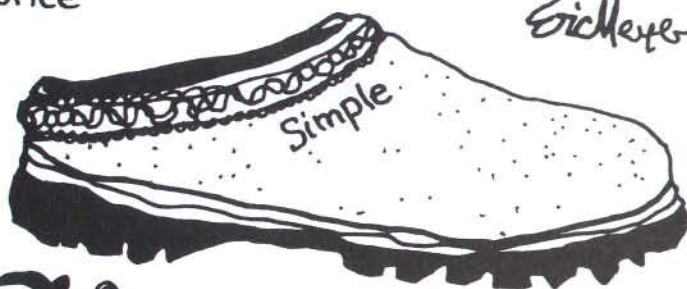
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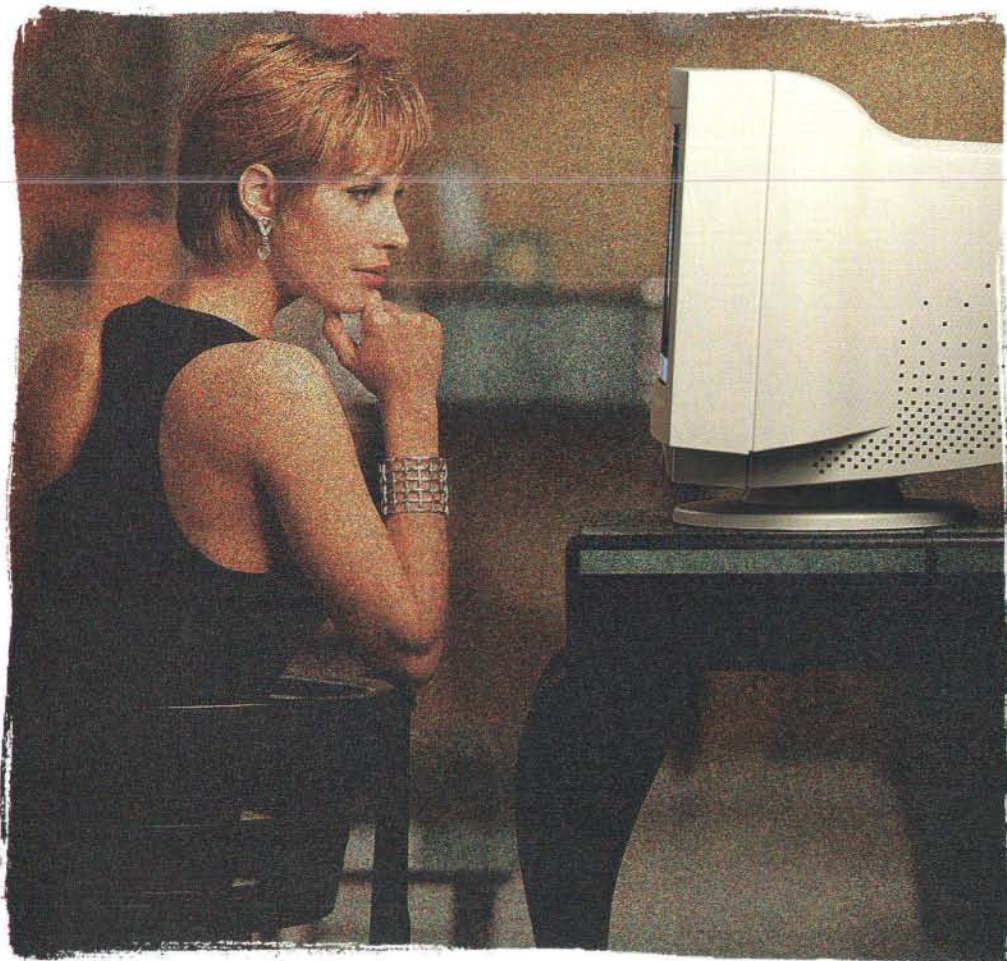
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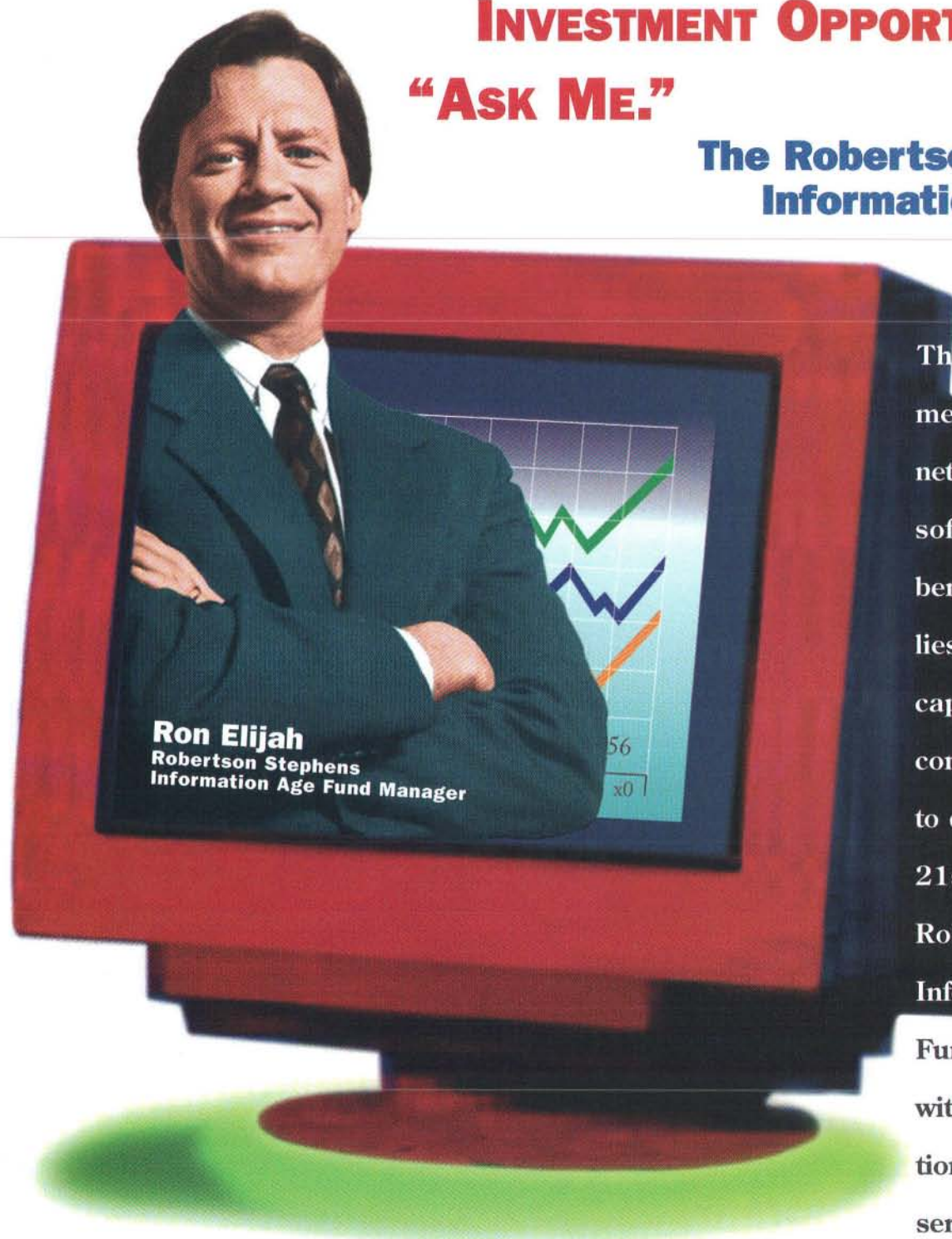
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The most efficient way to reach us at *Wired* is via email. Some addresses, such as guidelines@wired.com or info-rama@wired.com, will bounce back text, freeing us human types to create the next issue of *Wired*.

Wiped Out

Thanks a lot for the "The Great Web Wipeout" (*Wired* 4.04, page 125). Yes, indeed. Thanks to that article, the small, privately owned company that I work for decided to shut down its new interactive division. My co-workers and I all lost our jobs yesterday.

When I arrived home, the answering machine had messages from three of my closest friends. This is unusual because they are usually too busy to call in the middle of the day, let alone to ask if I was free for dinner, which they did, and I was. All three are — or, shall I say, were — employees of the online divisions of their companies.

In the small, suburban part of Miami where I live, the bars were overflowing with webmasters and webjefes (we are in Miami, after all) and graphics artists. Suddenly, our corporate-owned portable computers had been confiscated, and for the first time in years we were all out wandering the streets, looking at the stars (gee — there are lots of them, aren't there). I'm writing this email from an old Apple IIc I found in the closet that can still dial in to the server. They haven't shut it down yet — they probably just don't know how.

This morning I got in the car to go to work, but it dawned on me about a mile from home that there was no Web for me to work on. The realization seemed to hit half of the drivers on I-95 at the same time, because suddenly nearly two-thirds of the traffic shifted to the Miami Beach exit. When I arrived, the beach was packed with bespectacled, long-haired, lily-white people without bathing suits. We huddled in small groups, bragged about our old systems, and shook sand out of our Birkenstocks.

Now, after my first day of unemployment, I am sitting in front of this old Apple typing my last electronic muttering. Oh, what am I going to do? Here's one last smiley, though I don't really mean it. :-)

William Wetmore

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I would like to thank *Wired* for having the balls to write and publish the Web wipeout story. It is a brilliant look into the near future of the Internet.

Just the other day, I received a call from a telemarketing slime-type investment firm offering a chance to invest US\$15,000 in the "rapidly growing world of Internet commerce."

Ever since Netscape's golden day on Wall Street, I have played devil's advocate in conversations with my blinded-by-hope fellow Web geeks. For months I have argued that this frenzy of investment will cause the Internet to become the S&L scandal of the '90s.

I have worked with the salespeople who scramble

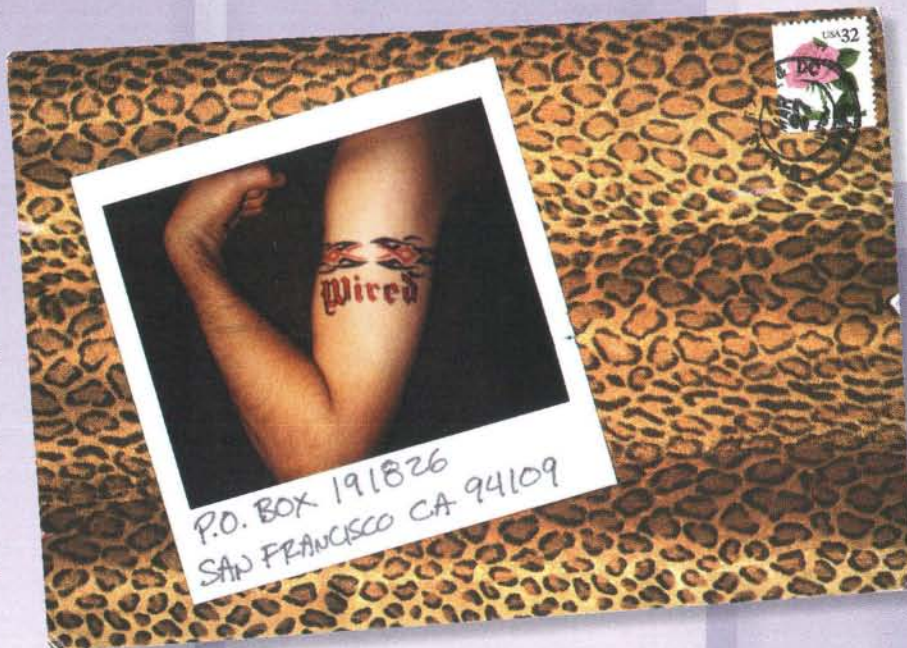
A Global Village, Huh?

Much could be said in response to Nicholas Negroponte's "Pluralistic, Not Imperialistic" (*Wired* 4.03, page 216), in which the main issue is elegantly avoided. I am talking about the binary representation of the characters I am writing right now — the seven-bit American Standard Code for Information Interchange, also known as ASCII.

Sending Internet email in Norwegian is like having a speech impediment forced upon oneself. Characters considered "special" by Anglo-Americans are essential to the freedom of expression of non-English-speakers. The telephone system does not require its users to speak only English, nor does the postal system require us to write only English.

Was someone talking about pluralism on the Net?

Tor Galaasen
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Gilder's Idiotic Crap

Hmm ... where have I seen *Wired* 4.03 cover boy's name before? ("George Gilder," *Wired* 4.03, page 122.) Oh yeah, in Michael Messner's book about sports sociology called *Power at Play*, according to which Gilder believes "athletic performance, for males, embodies 'an ideal of beauty and truth,' while women's participation represents a 'disgusting perversion.'" Gilder also argues that "the female body ...

more closely resembles the body of non-hunting primates. A woman throws, for example, very like a male chimpanzee."

The Reagan administration drew heavily on George Gilder's theories for its anti-feminist family policies. I hope I have the wrong Gilder, 'cause I'd like to think y'all wouldn't put someone squawking such idiotic crap on the cover.

I guess the big money's not in revisionist bio-sociological mumbo jumbo anymore. Now it's in claptrap about gettin' wired.

Matthew Margolin

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to cash in on the wave, and I have designed sites for companies that have paid them and service providers thousands of dollars for the "privilege" of being on the Web. So far, few have paid off even a fraction of the money invested, and several have already begun packing it in and writing off the Web as a bad investment. How long can it be before they realize that online commerce isn't only dead, it never happened? How long before investors in Internet technology realize this, pull their money out, and go in search of the next Holy Grail?

Bill Schwab

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Loose Spelling

One pet peeve I have about the Usenet rec.sports newsgroups is the use of the word *loose* instead of *lose*. The high school English teacher in me shudders every time I see the mistake.

But now this novel usage of *loose* has found its way into your edited magazine. In "Whose Status Quo?" (*Wired* 4.04, page 101) Simpson Garfinkel writes that "law enforcement officials claim they will loose this powerful tool if telephone companies are not forced to build switches that are wiretap-ready."

Instead of cringing, I am starting to wonder if we are experiencing a change in the English language. Imagine looking up the word *loose* in *Webster's Dictionary* 100 years from now and reading: Variation of *lose*. (Origin: Usenet, late 20th century.)

Then again, there are some things a spellchecker won't catch.

Edward Aboufadel
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Thanks, but loose the p in Simson Garfinkel.

Tasteless Color

You might be amused to know that at the Trend Union fashion forecasting seminar this week, *Wired* magazine was featured in one of the slides as an example of the return of truly tasteless color trends.

I think you should take this as a compliment. If only you could have seen that tired sea of black-clad fashion victims crowding the amphitheater, you would agree.

Heidi S. Everhart
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All the Freedom You Want....

Charles Platt's "Americans Are Not as Free as We Think We Are." (*Wired* 4.04, page 82) exposed only the tip of the iceberg. Things are much, much worse. As the March issue of *The Mouse Monitor* (scope@mail.britnet.co.uk) revealed, the private company that controls the registration of domain names, Network Solutions Inc., is owned by Science Applications International Corporation (SAIC). The SAIC board of directors reads like the Who's Who of the US intelligence community and is probably an asset of the CIA.

The present board includes Bobby Ray Inman, former director of the NSA and former deputy director of the CIA, and Donald Hicks, former head of R&D at the Pentagon.

In recent years, the board has included John Deutch, current director of the CIA; Anita Jones, director of defense research and engineering; Melvin Laird, secretary of defense under Nixon; William Perry, current secretary of defense; and Maxwell Thurman, who commanded the US invasion of Panama.

Internet advocates are just now experiencing what others have experienced for years. The Unabomber

put it nicely: "You can have all the freedom that you want as long as the authorities consider it unimportant." Apparently casual conversation between two or three individuals is OK, but real-time communication among thousands might be dangerous and therefore must be watched and controlled.

You are fighting an uphill battle, and I commend you, but I will applaud and watch you from the sidelines in Costa Rica.

Rolf von Richter
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The tip of this iceberg surfaced in late January in *Cyber Rights Now* (*Wired* 4.02, page 72).

But What Is Freedom, Anyway?

Tom Jennings is wrong in thinking that the Free Software Foundation's *free* is free in the sense of no price ("The Anarchist," *Wired* 4.04, page 120).

As Richard Stallman explains in a footnote to the GNU manifesto, "Free software is software that users have the freedom to distribute and change" (www.ifi.uni-klu.ac.at/Manuals/xemacs/xemacs_36.html). And that's a very valuable notion.

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Bias and Balance

Bruce Sterling's writing is entertaining and interesting ("Merchants of Venom," *Wired* 4.05, page 65), but he needs to be a tad more unbiased about his neighbors to the east. Oddly enough, I was less sensitive about Louisiana-bashing before moving to the ostensibly open-minded Northeast, where the surprisingly high amount of "racist, lunatic Southerner" stereotyping I have seen has made me a tad thin-skinned.

Although Louisiana politics has more than its fair share of the deranged, generalizing the whole state as a "lunatic backwater" is unfair. One of the reasons John Heilemann's previous Netizen column ("The GOP Big Tent Is Full of Holes," *Wired* 4.04, page 63) struck me was that he was the only print journalist to recognize that Louisiana citizens did not elect David Duke because of his racism; they elected him in spite of it. Racism was a part of the package that some Louisiana voters (I was not among them) were prepared to swallow to get the rest of the platform.

You don't have to be in the South to be intolerant. Louisiana and Alabama, and for that matter Texas, do not have a monopoly on either lunatics or rednecks. Pat Buchanan knows this and is therefore confident of having a core constituency wherever he goes.

Todd Belton
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After spending endless hours watching junk political coverage on CNN (aka the Cable Newt Network) and trying to get real political news out of the local

Quayle-family-owned newspaper (*The Indianapolis Star*) that treated Richard Lugar as if he were a viable candidate, "Merchants of Venom" struck me as a ray of hope that someone out there might actually have an opinion based on facts, which is a scarce commodity in the United States.

Sterling's analysis of each Republican candidate's pitfalls and pratfalls, seen through the unblinking eye of his own TV ads, leads me to believe that he is far more savvy than the photocopy-journalists of *Newsweek*.

Your article also echoed my own sentiment that, since 1980, it hasn't gotten any better. It's extremely depressing to know that for my entire working life I will never make enough money to buy a house, have children, own a car, or take part in that thing called the American Dream. And it doesn't help to hear 800-year-old Bob Dole telling me what he can't do.

To offset the fact that my vote means nothing, that I'm completely disposable as a worker, and that I seem to earn less and less each year, I'm considering emigrating. I'm looking for a country where no one has ever heard the terms "core competency," "golden parachute," or "outplacings."

So far, Mars looks really good.

Thanks for the great article. You didn't pull any punches or grind any axes, and it solidified the fact that the US is a terrible place for an American to live. Which means you've given me honest political coverage.

Jason Salisbury
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The Bullet Vote

Although "The GOP Big Tent Is Full of Holes" gave an excellent and reasonably evenhanded assessment of the GOP's problems in maintaining a coalition of widely disparate voter-interest groups, you missed one of the most important facts of life about the 1994 election and the coming 1996 elections. While concentrating on the landmine pro-life issue, the article short-changed the much greater influence of the bullet vote.

While the Christian Coalition claims 1.6 million card-carrying (and presumably money-contributing) members, the National Rifle Association has double that and is the only effective organization espousing the interests of 60 million gun owners in America.

Thanks to the radical, liberal wing of the Democratic Party, and the tireless efforts of mouthpieces like Hillary Clinton, Sarah Brady, and Charlie Schumer, those 60 million potential voters have no doubt whatsoever who their enemy is. The quasi-religious fervor of gun haters has driven a third of the voting public away from whatever the Democratic Party may have to offer, and toward the only alternative, the Republican camp. The leaders of the Republican Party aren't the only ones who, in the words of your author, "just don't get it."

Ed Arnold
fasteddie3@aol.com

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The Elephants Aren't the Only Asses

Brock Meeks is right to complain about the rogues who legislated the Communications Decency Act ("The Rogues Gallery," *Wired* 4.04, page 80). But it was startling that all five of the legislators he criticizes are Democrats.

There is plenty of blame to go around for this debacle, and the Republicans should bear their fair share. Bob Dole and the Christian Coalition worked for the passage of the CDA. Newt Gingrich didn't lift a finger to block it. And it's Democrat Patrick Leahy of Vermont who is currently fighting to repeal it.

Mark Lemley

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The Internationalnet

From outside the US, it seems that this free speech battle is being fought by people who do not really understand the Internet. Even if most of the Internet traffic is in the US, it is strange to hear advocates of the "universal information system that goes beyond borders" get worried about a law that affects only 4.5 percent of the world population. How could an American law deeply affect the Internet? What can America do to a server in Iraq holding anti-American propaganda except bomb it?

This campaign reflects a narrow, US-centric belief that what happens in the US happens to the world.

Philippe L 

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Night Reading

When I was called by the Israeli army to do a month of night guard duty as part of my reserve service, I decided to take the latest issues of *Wired* with me. But get this: turns out I can't read in the dark. So every night for the last week I have been trying to fight the cold weather, the desire to sleep, and the fact that, for one reason or another, I can't read in the dark. Could you possibly print the next issues in a glow-in-the-dark format?

Amit Bar-Nir

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Freudian Slipup

Pamela McCorduck is welcome to write what she wants, and *Wired* is welcome to publish it ("Sex, Lies, and Avatars," *Wired* 4.04, page 106), but McCorduck's shoddy scholarship and/or lack of cultural insight make this piece suspect if not entirely irrelevant. Introducing Sherry Turkle's intellectual sojourn with sweeping generalizations on Sigmund Freud's influence on French and American culture invites skepticism; enough to make this reader wonder if McCorduck is worth reading.

To be specific, she claims that Freud was dismissed by his French contemporaries and ardently adopted by American ones until the late '60s,

when the situation reversed: American interest in Freud waned, and the French interest rose to the point that the neo-Freudian Lacan became a pivotal thinker.

How can McCorduck dismiss the outspoken and high-profile Freudian advocates of the '20s and '30s, the surrealist group? And where were the surrealists centered? Paris. What of the intellectual darling of the late '60s on American campuses, R. D. Laing? Laing, as much a Freudian as anyone, clearly worked in the time frame during which McCorduck claims America had all but forgotten Freud.

I believe that McCorduck is struggling for relevance to support her affection for Lacan, who was only marginally relevant to American thought. That marginal relevance is based on the popularity of his intellectual noodlings and self-absorbed wordplay among college coffee bar types. Many writers want Lacan to be relevant, but for all the fun and charm his triflings offer, in the end they are about as relevant to American thought as James Joyce's *Finnegans Wake* is to Greek politics.

Pat Watson

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Pattonly Wrong

In "Robots with the Right Stuff" (*Wired* 4.03, page 148), Phil Patton writes that in the Gulf War, "it was made clear how sensitive we have become to any loss of human life."

I read it once, and it didn't make any sense. I read it twice, and I thought that it must be a misprint. Now I'm not sure what it is – but I am sure that it made me angry as hell.

After all, tens of thousands of people died in the Gulf War. And I don't remember any signs of sensitivity or regret. Of course most of those victims were members of the Iraqi armed services.

I'm not blaming the US for the war, but I am blaming Patton for denying the humanity of those who were slaughtered by superior technology. Patton's claim would make sense if he had replaced *human* with *American*, but maybe Arabs aren't truly human in his eyes. Maybe they are just some kind of biological robots without the right stuff?

Tuomas Kilpi

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Saint Marshall of the Catchy Phrase

The ideas that preoccupy our minds are often those we can't fully understand. This is one reason for our fascination with Marshall McLuhan, patron saint of the catchy phrase ("The Wisdom of Saint Marshall, the Holy Fool," *Wired* 4.01, page 122). Our obsession with McLuhan and his ideas also points to a larger issue: the structure of authority in a world dominated by "cool media," to borrow a phrase from Saint M.

In a world where turning every corner, changing every channel, searching every Web page offers new messages, information is accessible to nearly anyone who needs or wants it. And when each info-source represents a Sisyphean hill of tacit knowledge, can any one individual understand all the data from every field with the same clarity as a specialist?

The answer, I believe, can be found in our continued obsession with Marshall McLuhan. We are gripped by McLuhan's ideas because we don't understand them. And we don't understand them because they are metonymous: their parts stand for a whole requiring a mountain of tacit knowledge that we cannot access (perhaps because we don't read McLuhan or perhaps because he wasn't clear in his reasoning). We all understand, in some form or another what a global village is, for example, but is it the same understanding that McLuhan had? Unlikely.

Language, like most people's understanding of McLuhan's phrases, is primarily based on metonymy – the gap between object or idea and the word used to describe it. McLuhan's phrases are readily digested, but their meanings are not.

Metonymous leaps will determine who and what is authoritative in a world overflowing with information. With no possible way of understanding or synthesizing all the relevant information available on a particular subject, we must take the representative parts to understand the whole. Authority will be held by those, like McLuhan, who can give us the slogans to hang our ideas on, but who make the reasoning behind those ideas as inaccessible as possible.

Rees Kassen

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Undo

■ Star Log: Our reference to the Paramount-Hilton development in Las Vegas as "the first-ever *Star Trek* theme-park attraction" (Update, *Wired* 4.05, page 80) ignored the old *Star Trek* Adventure attraction at Universal Studios. ■ Veritas: Nick Arnett works for Verity Inc. and not Open Text, as the article "Bots Are Hot!" (*Wired* 4.04, page 114) might have suggested. ■ Reshoot: Jim Cameron ("Cameron Angle," *Wired* 4.04, page 130) filmed part of *Titanic* off the coast of Saint John's, Newfoundland. ■ Ein Undo: A few URLs mentioned in "Beating the Bavarians" (*Wired* 4.03, page 46) were incorrect. Find the NewsWatcher for Macs at <http://monitor.net/pub/mac/NewsWatcher.sit>, the list of Usenet sites at dana.ucc.nau.edu/~jwa/, and more details about the case at www.c2.org/~offshore/.

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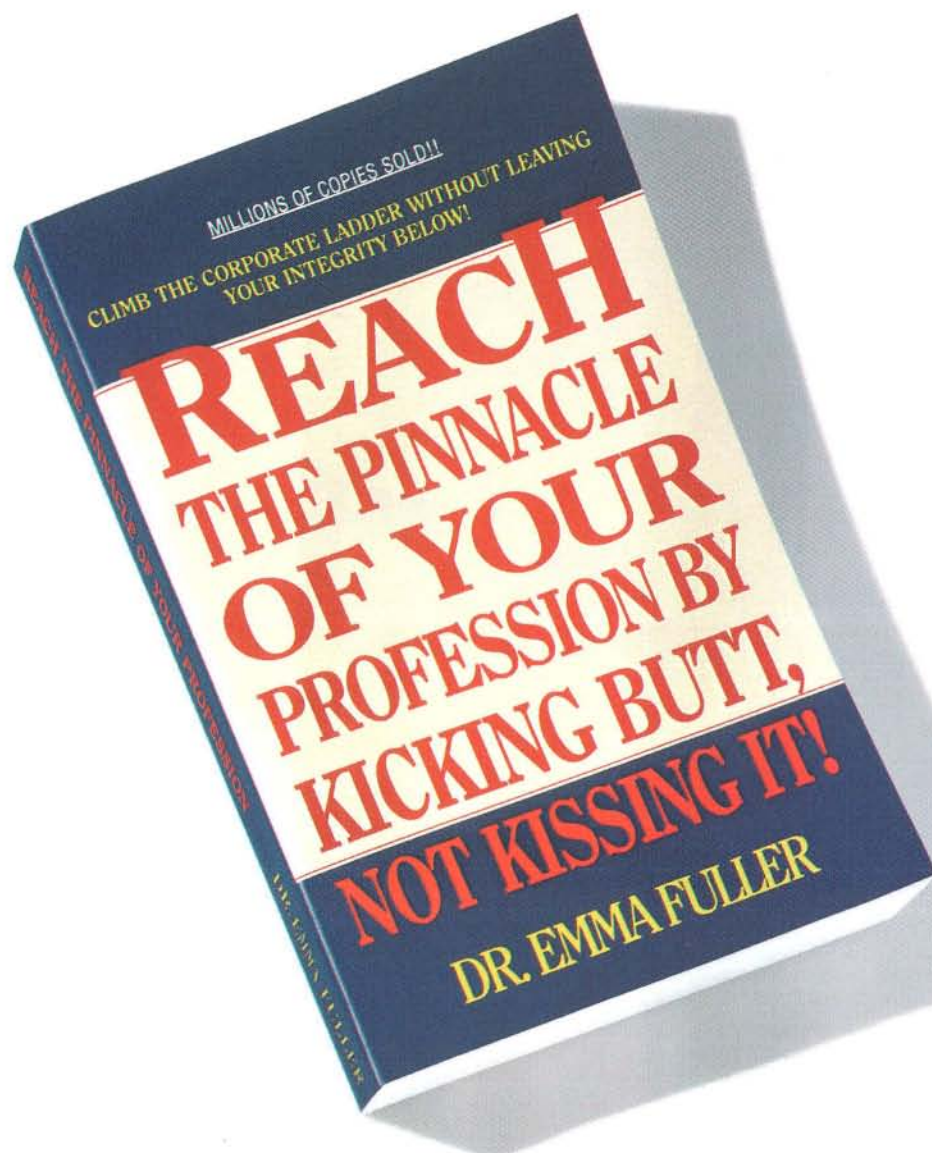


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Pie in the Sky

Stratospheric real estate is virgin no longer. By the turn of the century, Sky Station International Inc. plans to place 250 40-ton wireless communications platforms in fixed position 100,000 feet above Earth. Helium-filled dirigibles, GPS, and football-field-sized solar panels powering zero-pollution "ion engines" will keep the units in place. Sky Station claims the proximity will allow it to handle broadband data traffic to portable devices at speeds up to T1 - much faster than planned orbital systems like Gates and McCaw's Teledesic or Motorola's Iridium.

Sound crazy? It's not. With a private equity investment of US\$800 million and a preliminary OK from the FCC and NASA, the Sky Station dynamic duo of Alexander P. Haig, son of investor and former Secretary of State Haig, and satellite pioneer Martine Rothblatt will soon grovel for international spectrum at the 1997 World Radio Conference in Geneva. Anyone for a pressurized, prefab, tropospheric Village of Tomorrow? - Roderick Simpson

E L E C T R I C W O R L D

Senator Conrad Burns (R-Montana) is treating opposition to strong encryption legislation on Capitol Hill like damage on the Internet: he's routing around it.

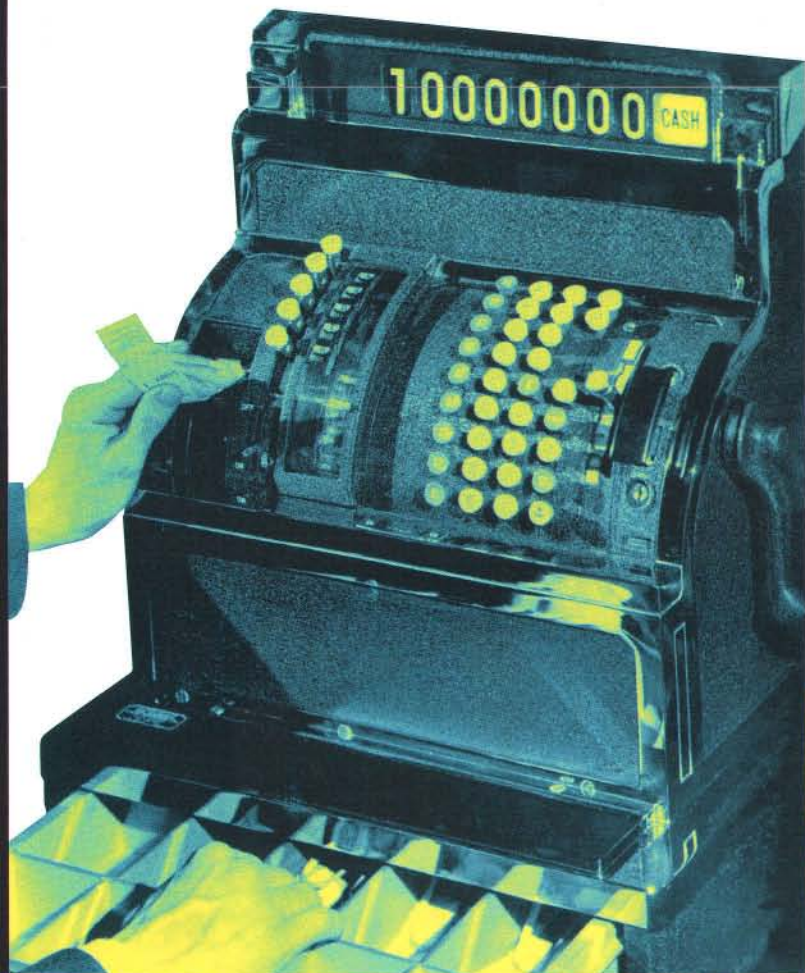
In May, Burns introduced the Promotion of Commerce Online in the Digital Era Act of 1996. Designed to short-circuit the Clinton administration's botched Clipper II key escrow proposals and export restrictions, Pro-CODE makes an end-run around Republican Senator Orrin Hatch's

Treating Congress as Damage

net.hostile Judiciary Committee with the sponsorship of Senator Larry Pressler (R-South Dakota).

But Pro-CODE has other influential friends too. Republican presidential hopeful Bob Dole has joined the ranks as a co-sponsor. Dole may not be an online visionary, but with luck, privacy and security on the Internet will surface as issues in the '96 presidential campaign. Look out, Slick Willie ... come November, netizens might just decide to route around you, too. - Todd Lappin





The Web Nets a Commercial Success

In early April, the number of domain names registered with InterNIC, the Washington, DC, organization that approves .net, .com, .org, .edu, and .gov addresses, crossed the 340,000 mark. That's up 66 percent from the 205,000 signed on at the beginning of the year.

Those new domain names represent US\$10 million in registration fees. Remember when just last year people said this level of

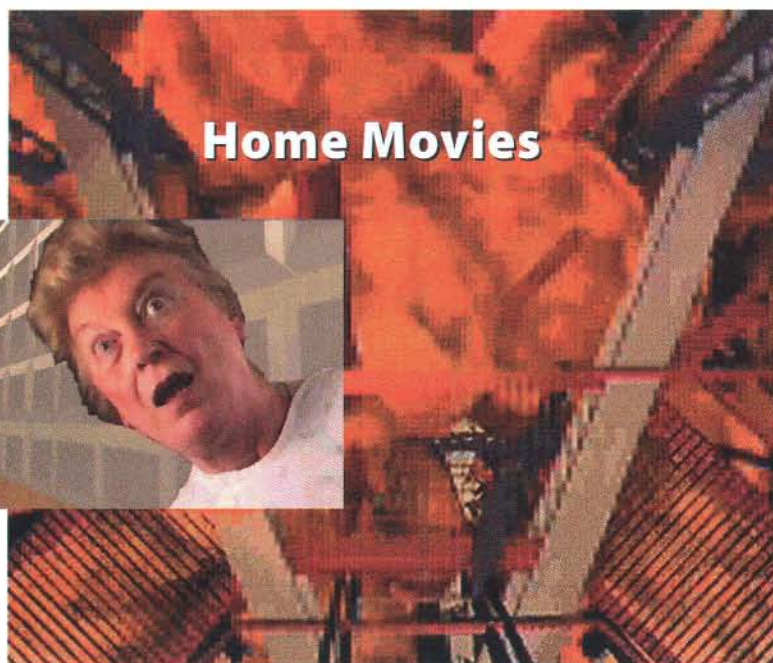
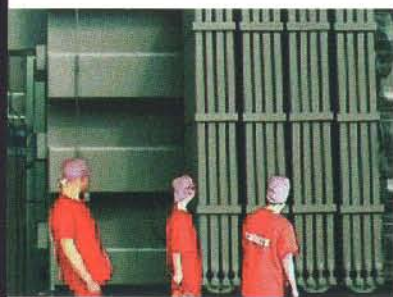
money pouring into a Web company was fantasy? With 10,000 or so name requests weekly, the InterNIC franchise will be worth more than a billion dollars this year.

Perhaps the National Science Foundation should have been more careful in handing out this monopoly. Not that we'll ever see the contract broken – at this point, InterNIC would likely fight tooth and nail to keep its lucrative business going. – Perry Metzger

≡ Sex = Entertainment: That's AOL's message, anyway. Last month, a user typing the word sex into AOL's keyword function – which lets users jump from one section to another within the service – was greeted with a message: "Got your mind on Sex? Maybe you should be thinking Entertainment?" (We're not making this up!) Adding injury to insult, typing in any keyword subsequent to sex still sends you to AOL's squeaky-clean Entertainment section, as if to punish you for thinking such naughty thoughts. So kind of AOL to politely remind us what we should be

thinking about. ≡ ACME Internet Corp.: Quick, think of Zenith. What comes to mind? Clunky American televisions the size of pianos? Three-button "Space Command" remote controls reminiscent of early *Star Trek* phasers? Wrong! Zenith Electronics is now a sexy Internet company, at least according to the Wall Street dunderheads who classify companies by industry type. Once they heard about Zenith's recent joint venture with US Robotics to make a hybrid cable/telephone modem system, the stock got hot, and the company more than tripled in value in just one week. Never mind that the joint venture has yet to deliver a product, or that the system is based on old ▶

Two years in the making, *Generation War: Near Dead* is the first feature film produced entirely on a PC, published on CD-ROM, and shown in weekly installments on the Web. Although Pixar made *Toy Story* on high-end workstations, Phil Flora, the creator of *Generation War*, resisted the temptation to use better equipment. He fed live video directly into two 486 machines and



a Pentium, then composited the film's backdrops and special effects.

To make the futuristic police-state rescue film, which runs an hour and 15 minutes, Flora shot footage in a small townhouse apartment. "We didn't need a lot of space," he says. "With our modeling software, we could shrink down the people who needed to look farther away." Email philflora@aol.com. – Bob Parks

Perhaps you've received unsolicited advertising in your email box from Cyber-Promotions or a Canter & Siegel clone. Thanks to Joel Snyder, founder of Opus One in Arizona, Net accounts can be saved from choking on 100-message email attacks.

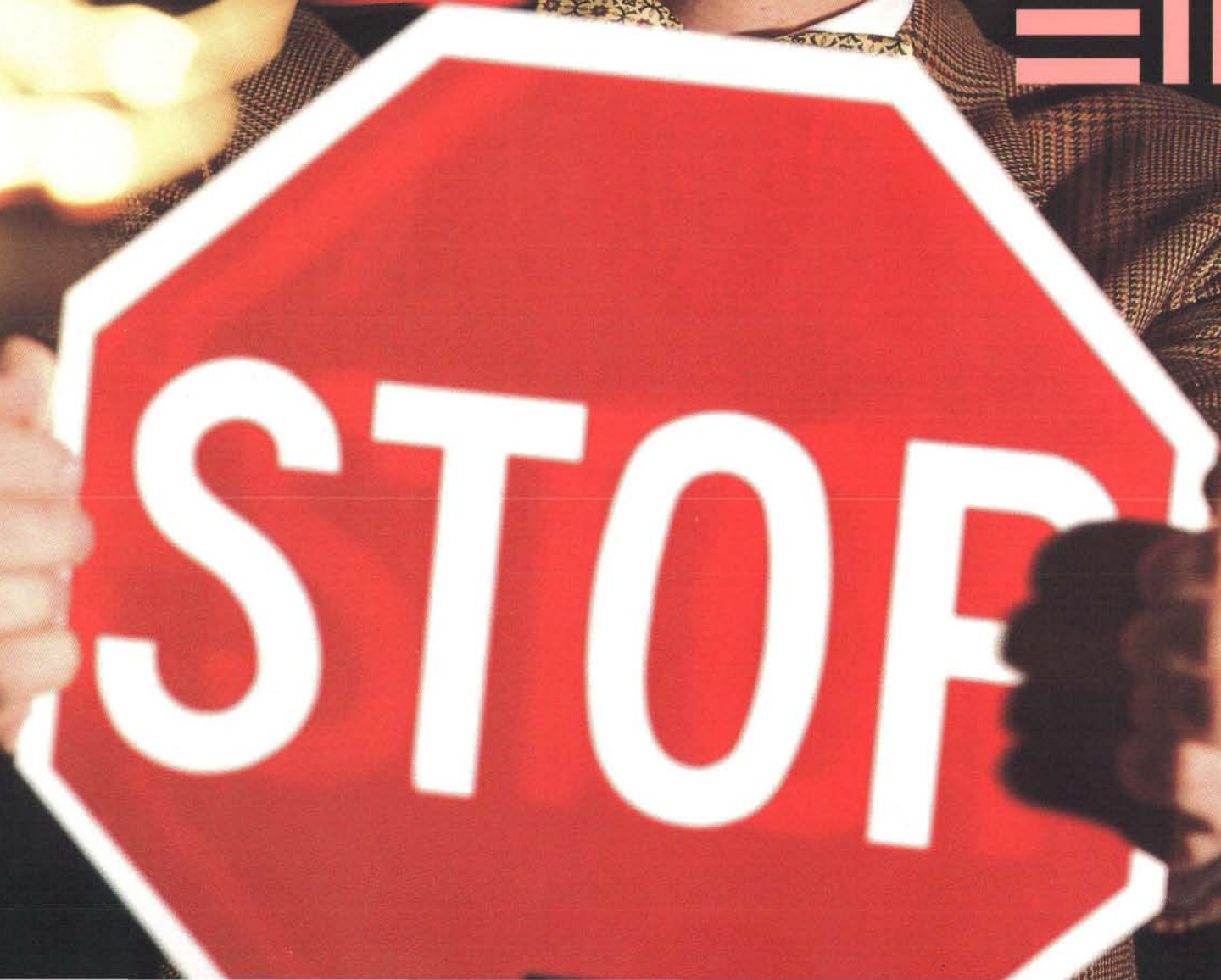
Snyder puts Storm, his anti-spam software, to work for corporate clients. It slows down the acceptance of mul-

tiple messages from one site and filters repetitious email.

Snyder reports brisk demand for the service. His latest project was outfitting President Clinton's mail server at whitehouse.gov. It seems some folks prefer to mailbomb the president, Snyder says, "rather than express their displeasure in a rational way." For more information, see www.opus1.com/www/jms.html.

— Dave Cravotta

Anti-Spam King





Nothing makes manipulating complex 3-D images, media authoring, publishing and software development easier than the Power Macintosh 9500 computer.



From the Autobahn to the Infobahn, Apple technology puts the BMW Z3 roadster on the world's fastest highway.



With innovative Apple technology such as QuickTime VR, the BMW web site is turned into a virtual reality. Explore the roadster inside and out by moving forward and backward, panning left to right, up and down. Just about the only thing you can't do is kick the tires.



More multimedia Internet sites are created on Macintosh than on any other computer.



Once again, BMW showcases some of the world's best technology.



QuickTime movies. Digital videos so realistic that the only thing missing from taking the Z3 roadster for a test-drive is the wind in your hair.



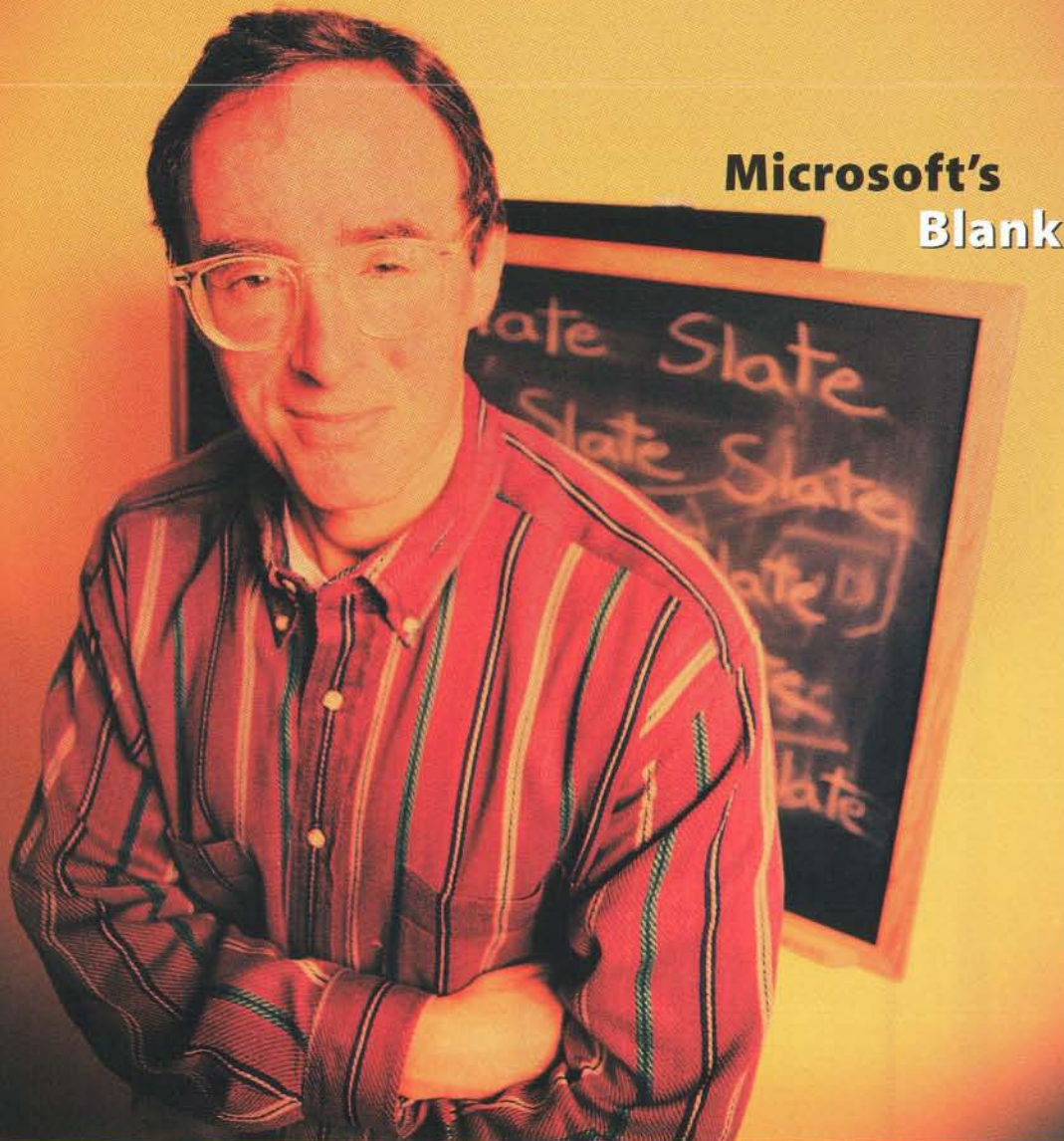
To serve up their web site, BMW uses the Apple® Internet Server Solution, one of the easiest ways to put a site on the Net and powerful enough to handle over 200,000 hits per day.

Only in this case we're talking about BMW's amazing new web site. The web site that actually lets you test-drive the Z3 roadster in the comfort of your living room. And how did BMW put one of the most innovative web sites on the Internet? With Apple technology, of course. As Jim McDowell, VP of Marketing at BMW of North America, puts it, *"We wanted our web site to have the same performance and excitement as our BMW products. Apple was the perfect partner."* So visit www.bmwusa.com to check out some technology that really moves. Oh yeah, and while you're at it, check out the car.

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Microsoft's Blank Slate

When Michael Kinsley stumbled through an NPR interview about his new job as editor of a then-unfocused and unnamed Web publication for The Microsoft Network, we were willing to cut him a break. It was apparent to anyone listening to *All Things Considered* that the former *New Republic* honcho and *Crossfire* host had spent little or no time thinking about how to tell stories on the Web.

Six months later, his site has a focus and a name – but Kinsley's understanding of the Web appears to have regressed. Debuting this summer, it is, unsurprisingly, about politics and culture. Its chosen name is *Slate* – “as in blank,” Kinsley is telling interviewers. With his insistence on calling it a magazine, and his plans to produce paper copies of what he says will be “plain-old articles,” Kinsley's *Slate* is poised to deliver an experience akin to the sound of fingernails being dragged down a chalkboard. – Ned Brinard

► technology that won't bring us any closer to high-speed interactive communication over the Net. It's worth nearly US\$1 billion now! Buy buy buy! ☺☺☺ Spinmeisters: MSN's date with net.destiny may or may not have passed by the

time you read this, but that's little comfort to the scores of MSN content developers who signed up to create sites on what was supposed to be a proprietary service and paid as much as US\$250,000 for the right to be obsoleted by Microsoft's new “embrace and extend” Internet philosophy. “That's life on the Internet,” MSN's director of marketing recently told the *WSJ*.

Sure, but one problem, buddy. The folks who signed up with Microsoft back in 1995 weren't planning to live on the Internet. If they wanted to do that, they would have built a Web page. ☺☺☺ Seventy-Hour Work Weeks Explained: Everyone's working harder and longer, we all know that. Now there are studies that prove it, sort of. At least they show why people are spending so much time at ►

A Clone Is a Clone Is a Clone

When Lew Gerstner dropped the dress code at IBM, he sent a clear message against the kind of corporate groupthink conformity that was leading the company to ruin. But old habits are hard to break. Instead of busting loose from the standard blue suit, white shirt, and conservative tie, IBM men have simply exchanged one uniform for another – a white or blue button-down Oxford tucked into a pair of khakis. “It looks like a damn Gap ad over there,” says one Big Blue contractor. – Russ Mitchell





TIRED

Pirate software from Hong Kong
Global warming
Click-through rates

Mineral water
Cocooning
Mutual funds
Manhattan
Marijuana buyers clubs
Martha Stewart
Tank Girl
.com
Dell making IBM clones
Hong Kong action flicks
Urban assault vehicles
Atlanta '96
Lollapalooza
Frames



WIRED

Pirate software from Moscow
The new dust bowl
Finding "666" in the Proctor & Gamble logo
Caffeinated water
Bunkering
Gambling
Antarctica
Silly Putty buyers clubs
Julia Child
Hothead Paisan
.*
IBM making Apple clones
Learning kung fu from a Java applet
Schwinn cruisers
Sydney 2000
Tibetan Freedom Concert
Regions



Dutch Courage

Authorities in The Netherlands are determined to have an electronic printing press – a computer hooked up to the infobahn – in the hands of 1 million citizens within two years. That would be no small feat in a country whose more than 15 million people have so far been slow to hop on the digital communications bandwagon.

Still, Minister of Economic Affairs Hans Wijers, who announced the plan, vows to put some money where his mouth is. He promises 70 million guilders (US\$43 million) to companies that help achieve the goal. And Wijers appointed not one, but two working groups – which include civil servants, publishing powerhouse VNU, Philips, AT&T, and IBM – to develop an action plan.

Critics call 70 million guilders a piddling sum for such a large-scale operation. One thing's for sure, though: in Wijers, the Dutch now have their own Al Gore. — *Rogier van Bakel*

► the office. A Find/SVP survey discovered that Internet-connected workers spend an average of nearly eight hours a week – one whole work day – in the online world. We're sure they're doing research or swapping valuable work-related documents, not playing on *pop.com*

or, heaven forbid, downloading games. Actual-

ly, that's exactly what they're doing. Jumbo!

(www.jumbo.com), a shareware clearinghouse

that bills itself as the "coolest shareware site ►

Disconnected

SurfWatch Software, whose Net-blocking package ostensibly prevents kids from downloading naughty pictures, has caught the eye of another overreaching patriarch: Big Brother. Phone companies from Asia and Europe have asked about industrial-strength versions of the software that can be fitted to national phone networks.

The inquiries from the Singapore Broadcasting Authority and Deutsche Telekom create a sticky situation for SurfWatch. "We're all First Amendment

absolutists," says co-founder Jay Friedland. "But sometimes we feel like gun sellers: you're never sure whether the customer is buying the weapon to defend their home or to knock off the corner liquor store."

SurfWatch has yet to sign a deal, but Friedland says it'd reluctantly sell to either.

Singapore and Germany aren't the only countries interested in monitoring electronic highways. Friedland says it's fielded similar inquiries from AT&T. — *James Daly*



Apple's Bait and Switch

In May of last year, Apple Computer proposed a wireless "National Information Infrastructure band" to the FCC. The idea, announced with much fanfare, was to set aside 300 MHz of radio spectrum for free use by schools, libraries, and rural communities to connect to the Net.

But bad news came recently when the FCC announced its support for a separate Apple-backed proposal (this one for low-power wireless LANs) – not for the NII band.

What incensed supporters of the original proposal was that Apple CEO Gilbert Amelio went ahead and heralded

the result as a victory for "public-benefit networks," when it will more likely benefit Apple's checkbook.

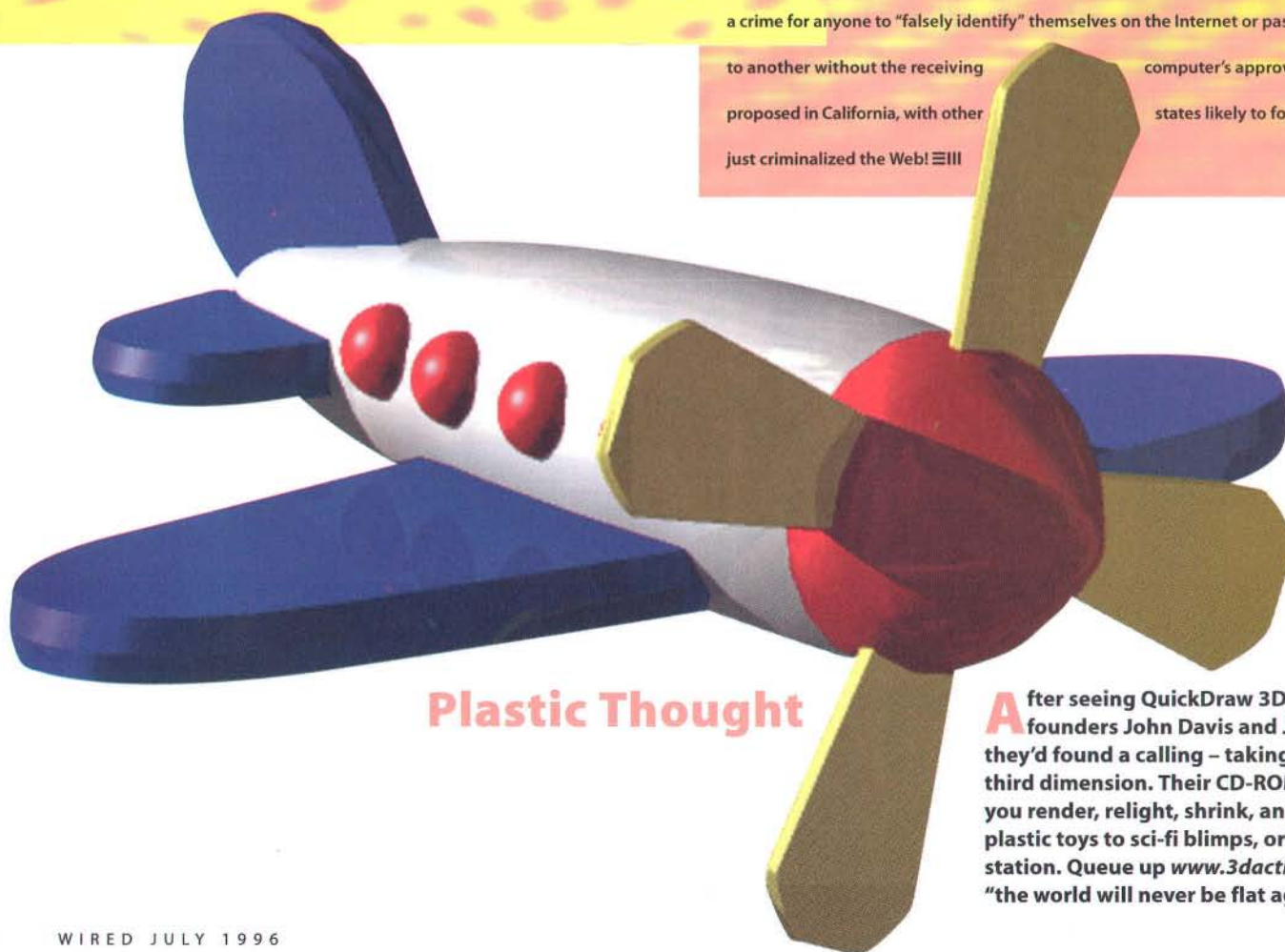
"Apple blew it," claims Gordon Cook, editor and publisher of *The Cook Report* on the Internet. According to Cook, Apple focused almost exclusively on advancing the more commercially attractive LAN proposal.

Not true, says Jim Burger, Apple's senior director of government affairs. "And even if it was true, people who support the NII band proposal need to register their comments with the FCC, not bash Apple." – *Steve G. Steinberg*



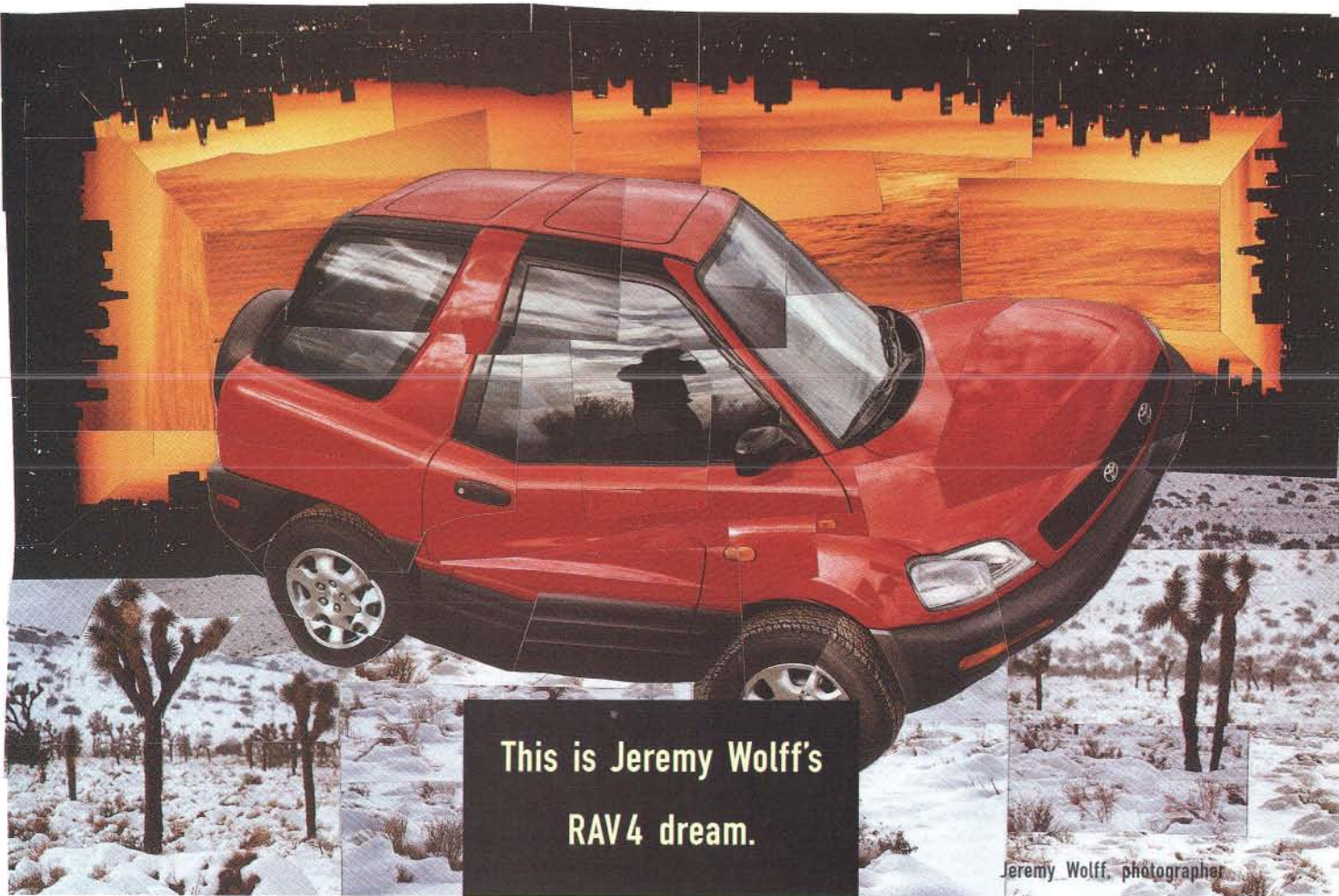
► on the Web," recently reported just who was downloading all those copies of *Choplifter*, *Windows pool*, and *Star Trek* games from its popular games section. The answer: mostly folks from J. P. Morgan, Lucent Technologies, J. C. Penney, and Citicorp, to name a few. In fact, Fortune 500 domain names were responsible for 800,000 downloads in the first quarter of 1996 alone. Downsizing, anyone? ≡III Newt's Homepage: Seems the folks back home haven't been listening to their favorite son's own rhetoric. Recent legislation passed in Georgia has secured that state a spot in the Stupid Government Tricks hall of fame. The new bill makes it

a crime for anyone to "falsely identify" themselves on the Internet or pass a user from one computer to another without the receiving computer's approval. Similar legislation has been proposed in California, with other states likely to follow. Way to go, Georgia, you've just criminalized the Web! ≡III



Plastic Thought

After seeing QuickDraw 3D, Plastic Thought co-founders John Davis and Joey Raffa knew they'd found a calling – taking the desktop to the third dimension. Their CD-ROM of 3-D clip art lets you render, relight, shrink, and flip objects from plastic toys to sci-fi blimps, or even build a space station. Queue up www.3dactive.com to see why "the world will never be flat again!" – *Rob Swigart*



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Jeremy Wolff, photographer

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Anticipatory Democracy

Alvin Toffler on American Chechnyas,
how Newt blew it, why we still need a new Constitution,
direct allocation of income taxes through checkoffs,
the Japanese Diet having a seat in Congress,
and other observations and heresies.

By Kevin Kelly

Remember Alvin Toffler?

A year ago he was the pop futurist you could not get away from. As the supposed mentor of future-hugging Newt Gingrich – then at his celebrity apex – Toffler's views on the current political tilt were in high demand. But this year, traditional election politics are in effect, and the future has disappeared. In fact, the future is being embalmed by presidential campaigning. We say: it's time for a look ahead. The media have decamped from Toffler's front lawn, so we asked him what he and his wife, Heidi Toffler, have been contemplating lately on anticipatory democracy, grading Newt, revising the Constitution, and other matters of civilization building.

Kelly: What's the relationship between the digital generation and emerging Third Wave politics?

Toffler: The rise of the digital generation is part of a larger historical process, which involves culture, economics, social institutions, and so on. But it's a very powerful part. I think we're about to see an overall change in the politics of the country, during which the digital community will become much more conscious of its own political role.

Kevin Kelly is executive editor of Wired.

You've said before that the digerati should pay more attention to politics. What should we be doing?

Newt has said that every piece of legislation should be vetted from the point of view of whether it accelerates the transition to a Third Wave society. That is also the responsibility of the digital community. It means looking at everything, from tax policy to access issues to civil rights. For example, one of the issues we've raised repeatedly is the depreciation schedules that disadvantage the best, most dynamic companies in the country. The digital community has to be involved in these issues.

Do you see Third Wave politics being organized into a capital-letter political party?

That will depend on what happens over the next two years. If it turns out to be gridlock, frustration, difficulty, pain and agony, and no payoff, then I think a third – even fourth – party will materialize to meet the needs of the digital community. But if you take a look at other countries, more political parties do not necessarily mean better government.

Some suggest we think of citizens as customers.

Is this one of the characteristics of the Third Wave – that there are no citizens, only customers? ▶

www.wired.com/4.07/netizen/

This is not political coverage as usual. *Wired* magazine and its online cousin *HotWired* have joined forces to produce *The Netizen*, a new magazine/Web site providing an innovative package of daily, weekly, and monthly coverage of the 1996 presidential election, the last campaign of the unwired generation.

John Heilemann is filing an up-to-the-minute diary of the campaign in his "Impolitic" column on *HotWired* (www.netizen.com/). Also look for **Brock N. Meeks**, who is reporting daily in his column "Campaign Dispatch."

To say that we're all customers focuses on a single dimension of the relationship. Yeah, citizens buy government services. But there's a lot more going on in social existence than simple contractual relationships between customers and suppliers. That is far too narrow of a model. Whether we like it or not, there is a world of religion and feeling out there that cannot simply be reduced to contractual relationships.

Last year you were very optimistic that we were on the cusp of change in the overall politics of the country and that there would be a beginning of a political realignment. Do you still feel that way?

Yes. But it's not the realignment that most people think. I believe the election campaign and the battle between the two parties is ... I won't say it's irrelevant; the parties still command control of the incredibly large budgets. But the fact of the matter is the real politics in the country are reflected not in the distribution of votes between Democrats and Republicans, but rather in the "none" votes of the rest of the population, and in the revulsion of the population toward the system itself. And that has grown enormously and dangerously in the last year.

You mean the system could suddenly collapse?

We should learn a lot from what happened to the Soviets. They carried the Second Wave bureaucratic model to its ultimate, and we saw how fragile that system became. We're infinitely better off, because we're more loosely organized and more decentralized, more democratic. But I believe we are not immune to the kind of breakdown that we have seen there. One can, in one's nightmare, imagine American Chechnyas.

Is this where the militias and the separatists come in?

I believe they and others, probably not yet even formed, could be the American equivalent of the Aum Shinrikyo. (See "The Cult at the End of the World," this issue.)

What happened to Newt's revolution?

Right after he came in, he was fighting to pass the Contract With America. Well, the Contract With America was never a particularly Third Wave document. The only reason we felt it had any far-reaching importance was that it tried to move in the direction of devolution.

Devolution? As in anarchy and collapse?

I'm using devolution to mean the peaceful push of power downward, a peaceful redistribution of decision-making from the center down.

How is devolution to be distinguished from the nightmarish separatist movements?

We take the paramilitaries very seriously as sort of incipient separatist movements. Separatism is beyond devolution. I believe the only way to prevent the kind of outbreaks of separatism in the United States that Europe has been feeling for quite a while is to get

ahead of the curve.

So, what would a real Third Wave Contract With America have said?

Well, I think it would have said some of the things that Newt said *outside* the contract. Every kid should either have a laptop or access to its equivalent. And the country as a whole needs to be prepared to survive in an economy that is much more demassified than the one we are all accustomed to. We complain that kids don't know where Albania is. Well, there's another geography they know nothing about and that's the invisible social geography that they grow up in. What's the relationship between a department store, a police station, a bank, a hospital, and the Internet? That's the world we function in, but it's invisible.

Since the Contract With America is essentially a promise of what the state will do, and in your Third Wave world the state will do less, I imagine a Third Wave Contract With America would be very short.

In fact, yes. We have to decide what are the minimal requirements we need from the central government.

What do you personally suggest as the minimum?

The key is the Bill of Rights and protection of human rights within society. We should also, I think, agree that we need to continue the separation of powers.

Since the American bicentennial, in 1976, you've been advocating an overhaul of the US Constitution. Don't you realize that is sacrilegious?

We need to completely reconsider the structure of the Constitution. This is regarded as heresy. Wonderful as the document is, and it is, we're straining all of its provisions judicially to make it fit changed realities.

A good example is the cyberporn issue. Does the state have the right to keep cyberporn regulated, and does it have the capability given the new technology?

We should take the next 10 or 20 years to have a civilized, national discussion of what a 21st-century democratic Constitution would include.

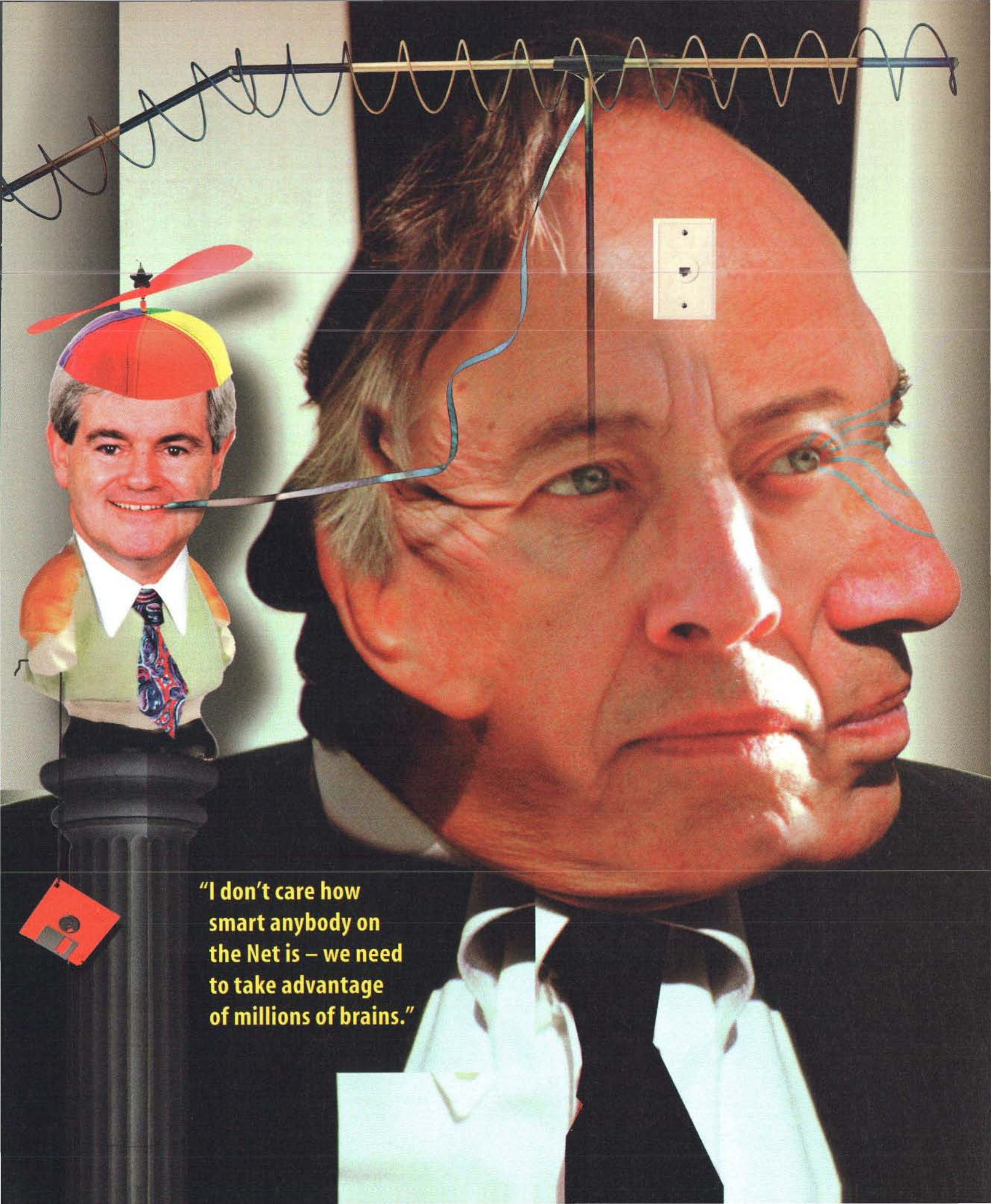
What is the process for rethinking the Constitution?

We can't really have a town hall meeting of 250 million. We know that doesn't work.

Well, many states have constitutional conventions and they don't blow apart. If I'm not mistaken, Hawaii still has a requirement for what it calls a Con Con, a constitutional convention, every 10 years. America is so diverse that we don't need one big national constitutional convention. What we want are thousands of groups discussing alternatives.

Are you optimistic that democracy will thrive in cyberspace?

What we have now is a form of democracy that is mass democracy, which is the political expression of mass production, mass distribution, mass consumption, mass education, mass media, mass entertainment, and all the rest. And what's happening is ►



**"I don't care how
smart anybody on
the Net is – we need
to take advantage
of millions of brains."**

that society is becoming more demassified, more heterogeneous, and it is therefore harder and harder to arrive at a majority on an issue. And when you do, it's frequently just an artifact of the voting system rather than an expression of the organic beliefs of the population. So we believe that there are very deep difficulties for mass democracy in the era of diversity, which is being propelled by the computer revolution. **Would you say that democracy is also undergoing a revolution?**

I think we should attempt to devise new forms of democratic practice that can handle the levels of complexity and speed our society requires. You could have 535 saints and geniuses in the House and Senate and they would still make stupid decisions. The reason

is the current process was never designed to operate at this level of complexity and speed.

Do you think we'll get to the point where everyone votes on every issue by clicking on a form on the Web?

We don't need to be trapped between the polar arguments that either all decisions are made by the people without any representative institutions, or alternatively, that they all are made by supposed-

edly representative institutions. There are many ways we can use the new technology to combine these - representative and direct - to take advantage of both. We call this semidirect democracy.

So what about electronic voting?

The political system is a collective decision-making process; it's a feedback system. One of its parts is the voting process. The voting process, given the limitations of communication information at the time of the writing of the Constitution, is a batch process. Every two years, every four years, every six years, we vote. The public feeds back into the system as a batch process. If, however, you look at those much maligned "special interests," they are a continuous process. They act on the system 365 days a year, 24 hours a day. So you've got two sources of influence on the system, one that is continuous and one that is intermittent and not even frequent. So, first of all, would it be advisable for others to adopt the continuous-flow style of the special interests? And secondly, is there a way to involve large numbers of people in continuous-flow balloting?

You could also imagine a network model in which we get away from batch mode in taxes and budgets.

That's our proposal. In fact, we suggested the following: every tax form allow every taxpayer to allocate 1 percent of his or her taxes. You would be able to allocate that 1 percent among the different govern-

mental functions. So maybe you want more given to health and less given to the Pentagon or maybe the reverse. Now when the IRS tallies that up at the end of the month, what it has, in fact, is a citizens budget. Our slogan is, No allocation without representation. And we could do this, by the way, not just at the federal level but at municipal, county, and state levels. **This is all very futuristic. But in the past year, the future has been the punching bag for both parties. Read at the level of *USA Today*, people are rejecting the future.**

For sure. The Democrats are trapped by teachers unions and the standard bureaucracies and political campaigns. Everybody knows that the educational system is a scandal. So no matter how many times Gore and Clinton talk about the need for better education, the frame of reference with which they think about it has to be acceptable to existing political forces. And the same goes for the Republicans.

By that logic, would you hypothesize that a leader of a successful campaign to change the fundamental structure of politics would have to come from outside the government and politics?

Leadership is going to come from very strange places. **OK. Let's say that God was going to punish you and make you run for president in 2000. What's on your platform?**

First, we have to look outward; isolationism is idiotic. Second, information and knowledge are the source of the well-being of the population; they are the source of the future and at least the material well-being of the people. Therefore, it is the Number One priority to liberate education from the factory model.

Playing along with this fantasy, at your press conference, a reporter from *Wired* notes that you've been on the record talking about letting the Japanese Diet have a seat in Congress. True?

Yes. That always gets a response. The argument is partly, of course, tongue-in-cheek. But there is a serious purpose behind it. First, if you believe in democracy, one of the principles of democracy is that you should have some say in the decisions being made that influence your life. Well, the decisions being made in the Japanese Diet affect American lives very deeply, but we do not have any formal representation in those institutions. So what we've said is not simply that the Japanese ought to be in the American Congress, but also that Americans ought to be in the Japanese Diet.

I bet we don't hear Pat Buchanan say that! One of the things that always impressed me was that two years before Newt hit the front page, you told me to pay attention to him. You said he was one of the few people in Congress who was thinking 30 years ahead. So who else in politics is doing that these days?

Oh, I don't know. What's happened is they've all

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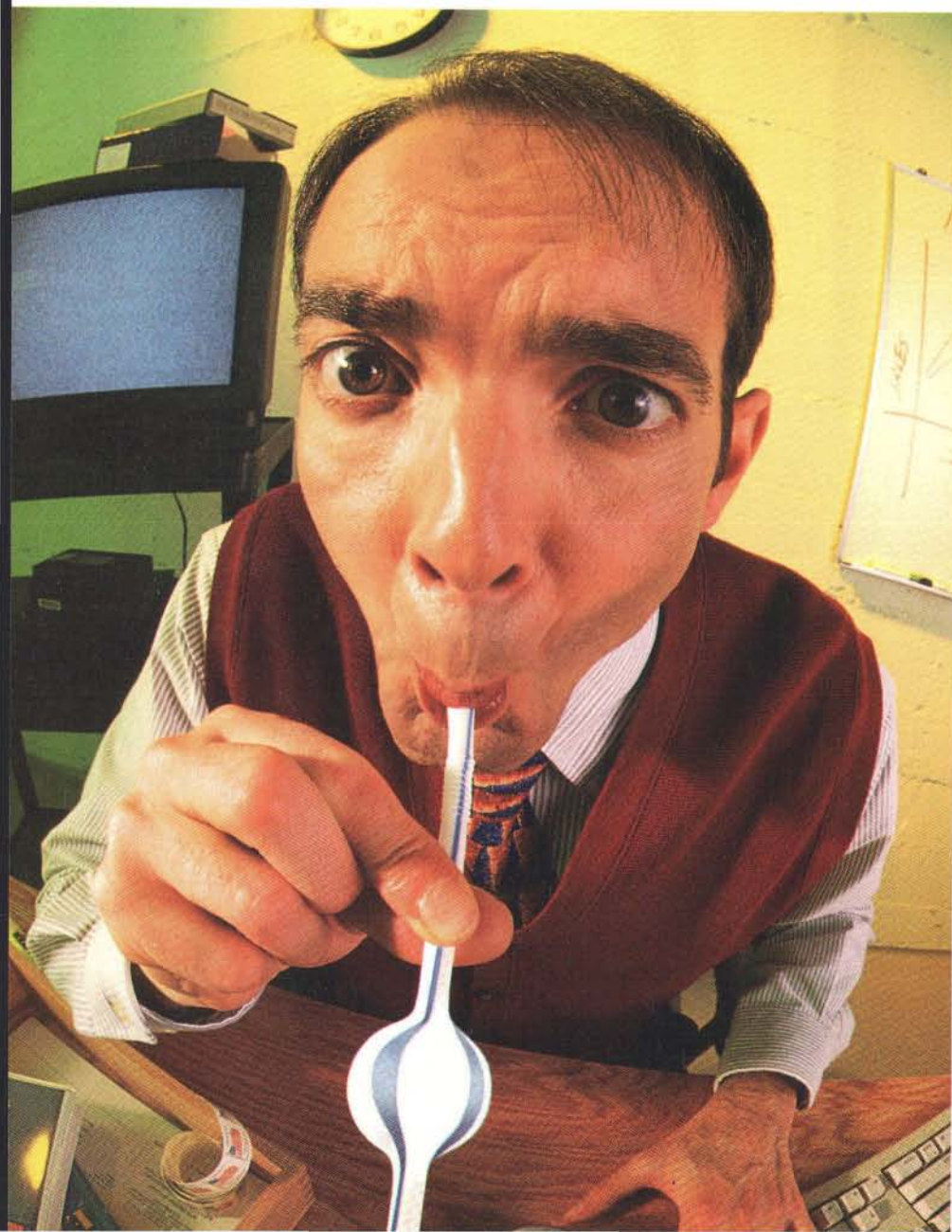


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If Spock Dialed In

Workplace style evolves again with Quicktel II, a line of external modems from Logicode. Straight out of Star Trek, these modems are designed to rotate according to your setup, allowing for maximum visibility by jealous co-workers in your orbit. Voicemail, speakerphone, and Caller ID functions are a welcome telephonic addition to this practical yet alluring way to log on. The Starship Enterprise should be so lucky. Quicktel II modems: US\$349 (LED model), \$399 (LCD external model). Logicode Technology Inc.: (800) 735 6442, +1 (805) 383 2500. ▶

Log On, Couch Out

Whether it's checking out a new CD-ROM or sending a group letter to Grandma, there's nothing worse than the whole family crowded round the computer: Mom, Dad, little Joey – it gets tight. Now you can take the party to the couch. Combining the family-friendly reality of TV with a computer's brain, Gateway 2000's Destination Big Screen PC offers the best of both screens, allowing a gaggle of users to watch the tube, surf the Net, or zap those pesky space invaders. Why get up? Destination Big Screen PC: US\$3,499 to \$4,699. ▶ Gateway 2000 Inc.: +1 (605) 232 2000, on the Web at www.gw2k.com/destination/.

Sound Off

Family Voice, available in Japan from Canon, is a simple little gadget with memory-based sound input/output. A magnet on the back lets you put Family Voice on the refrigerator, turning it into a family information board – kind of an audio sticky note. It can replay 20 seconds of recording, which makes it perfect for leaving short messages and phone numbers. But while Family Voice is cute, simple shapes such as circles or triangles might better engender the strange feeling of talking to your kitchen appliances. Family Voice: ¥2,800 (US\$28). Canon: +81 (43) 211 9390.

Way to Wireless

Everywhere you go, people talk wireless. Only thing is, the FCC is still grappling to retain control over the spectrum. So you take what you can get – Wavecom Jr. from RF-Link Technology. It's a wireless audio/video/computer device that transmits across distances up to 300 feet. Wavecom will even send signals from your computer monitor to your TV, transmitting data over the little-used 2.4-GHz frequency instead of the popular 900-MHz channel used in phones and other devices. And it's FCC approved. Wavecom Jr.: US\$199.99. RF-Link Technology Inc.: +1 (310) 787 2328, email rflinksale@aol.com.

F E T I S H

Edited by Tim Barkow

A puzzle.

The piecing together

of seemingly disparate elements

into a unified whole.

Luxury, performance, value.

These are the pieces.

Chrysler Cirrus,

owing to the resolve of a team of engineers,

is the unified whole.



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Free at Last

Remember how powerful you felt the first time you phoned sans cord? You paced, you danced, you washed dishes – all the while gabbing with Mom. VictorMaxx Technologies introduces the VIR one controller, a cordless, baseless, ergonomic joystick that connects directly into your PC game port. Sure, it looks kinda funny, but if you want to multitask while playing a newly minted version of Ms. Pac-Man, or need to jump around the room to really experience that virtual street fight, the VIR one is your move. ►
VIR one: US\$119; VictorMaxx Technologies Inc.: (800) 815 6299, +1 (847) 267 0007.

Psycho-Surveillance

Mad Max, perched high on a cliff while chowing down dog food and spying on the bad boys, would have loved Leica's Vector laser binoculars. This truly is intelligent observation – within seconds, the eye-safe, infrared diode laser rangefinder and electronic digital magnetic compass determine bearing and orientation of the object under scrutiny. Whether you're scavenging the desert for gasoline or cleaning up an oceanic oil spill, Vector keeps your eyes on the prize. Vector binoculars: US\$7,500. Leica Technologies Inc.: +1 (703) 404 0335, email leicasod@aol.com. ►



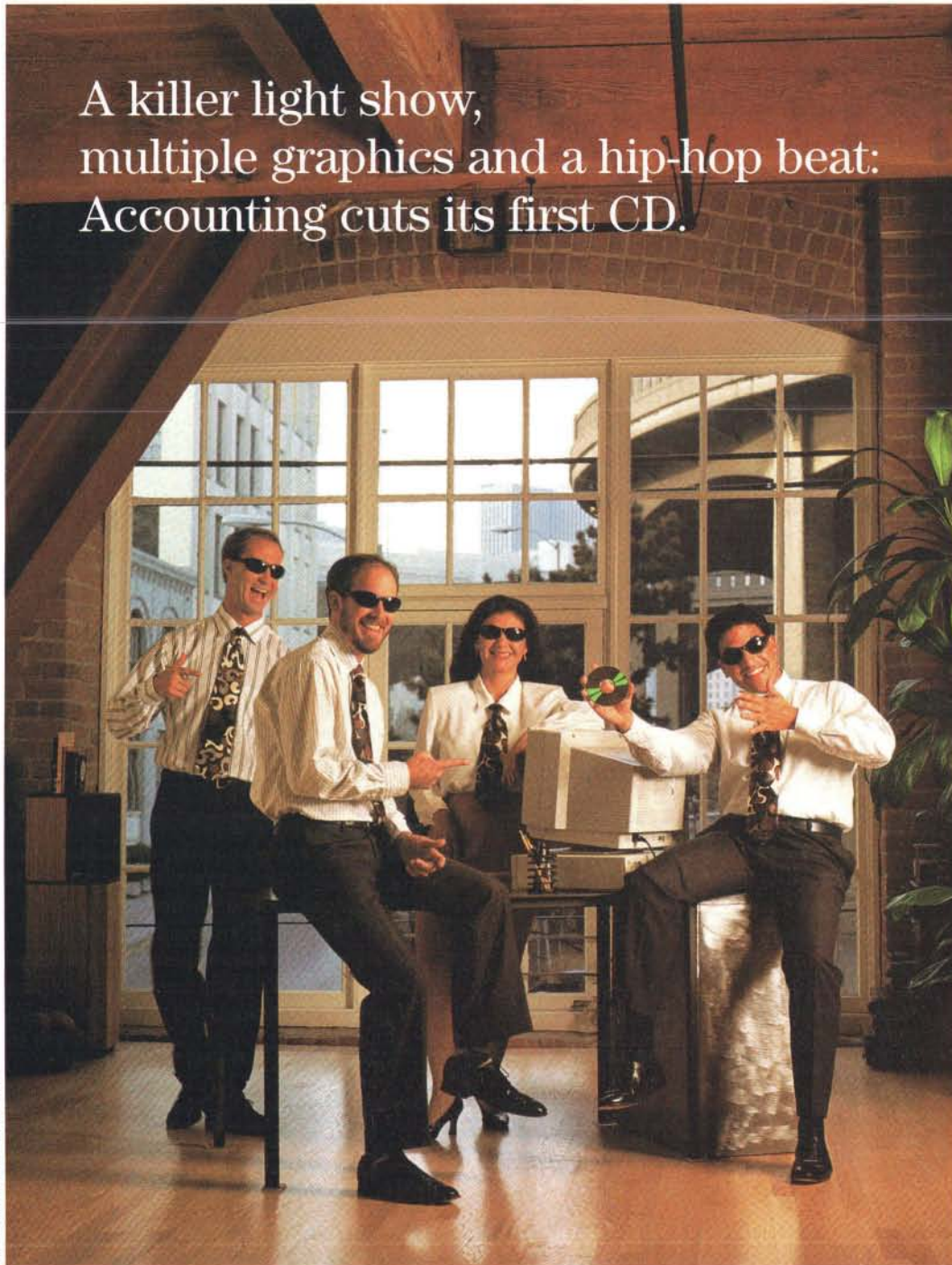
◀ Hog Wild

What exactly happens when a designer of state-of-the-art tech-toys turns his talents to the road? In the case of Machineart designer Andrew Serbinski, it means the genesis of the MK9, aka Machineart Kawasaki, a high-tech bike for the serious motorcycle junkie and a few of her closest friends. Combining the best in Japanese engineering with the elegance of a Beemer and the attitude of Evel Knievel (on a good day), the MK9 is one bad hog. (It's also an ergonomically correct one.) MK9: approximately US\$35,000. Machineart: +1 (201) 714 9846.

DigiRocky

Does your job take its toll on your sanity? Release your pent-up aggressive tendencies with this boxing bag from the folks at Hammacher Schlemmer. Sensors in the bag measure the power of your punches and kicks. The computer also allows you to set up to 16 four-minute rounds and program your routine and rest periods – for that full Rocky Balboa workout you crave. It's just about as real as you can get without having to take repeated punches to the noggin. Computerized Boxing Workout Bag: US\$299.95. Hammacher Schlemmer: (800) 421 9002, +1 (212) 421 9000. ►

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So whether you're a major multimedia supplier, an in-house service, or one of those groovy cats in accounting, the HP SureStore CD-Writer is the best way to set you apart. For more information on how to cut your first CD, call 1-800-826-4111, ext. 1261.



A New Way to Ride

Tired of mountain biking? The Outback mountainboard offers a whole new way to explore off-road trails. It looks like an overgrown skateboard, but its design combines aspects of mountain biking, snowboarding, skateboarding, and surfing. Three knobby pneumatic tires will roll over any terrain – rocks, grass, dirt, whatever. And don't worry, there's an add-on lever pad that allows for speed reduction in advanced riding conditions. Now, when you roam, you can roam anywhere. Outback mountainboard: US\$299. Earth Sports Products Inc.: (800) 654 6483, +1 (509) 783 0600.

Total Recall

Even octopi don't have enough arms to juggle the components in a typical home theater system. The Stage 3 KC-Z1 controller, a personal handheld touchpad from Kenwood, uses a GUI to activate and adjust your components. Meaning you won't have to grow new limbs if you want to kick in the bass on Coolio while adjusting the tint on the Knicks game. With six video inputs, five analog audio inputs, and four digital audio inputs, the KC-Z1 brings the ideal interface into reach. Stage 3 KC-Z1: US\$2,800. Kenwood USA Corp.: (800) 536 9663, +1 (310) 639 9000.



FutureTel

In Japan, it's called the Personal Handy-phone System. In the US, it's the much-heralded PCS. Either way, it's next-generation cellular, and it's as cheap as a call from a pay phone. Kyocera's MO-501 master connects PHS slaves, allowing you to use them as digital cordless units when the master is connected to a phone line. PHS handles data at 23 Kbps – a great wireless home network. MO-501 PHS parent unit: ¥45,000 (US\$430). Kyocera Corp.: +81 (45) 943 6138.

Every Angel Terrifies

Need camouflage for today's crud-shellacked wasteland? Slick on some lipstick or nail polish in industrial-chic hues such as Plague (rich violet with a blue sheen) and Uzi (très heavy metal). Urban Decay, the cosmetics venture from Cisco Systems co-founder Sandy Lerner, beckons a melding with rusted fire escapes and smoggy streets. Now you can really show 'em fear in a handful of dust. Nail enamel and lip color: suggested retail price US\$11 and \$15, respectively. Urban Decay: +1 (714) 494 9825.



Thanks to Marla Aufmuth, David Boyer, Harry Stewart Case, John S. Couch, Jesse Freund, Kristin Lowe, Tessa Rumsey, Larry Smith, and Wired Japan.





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Perhaps we should tell you how we really feel.

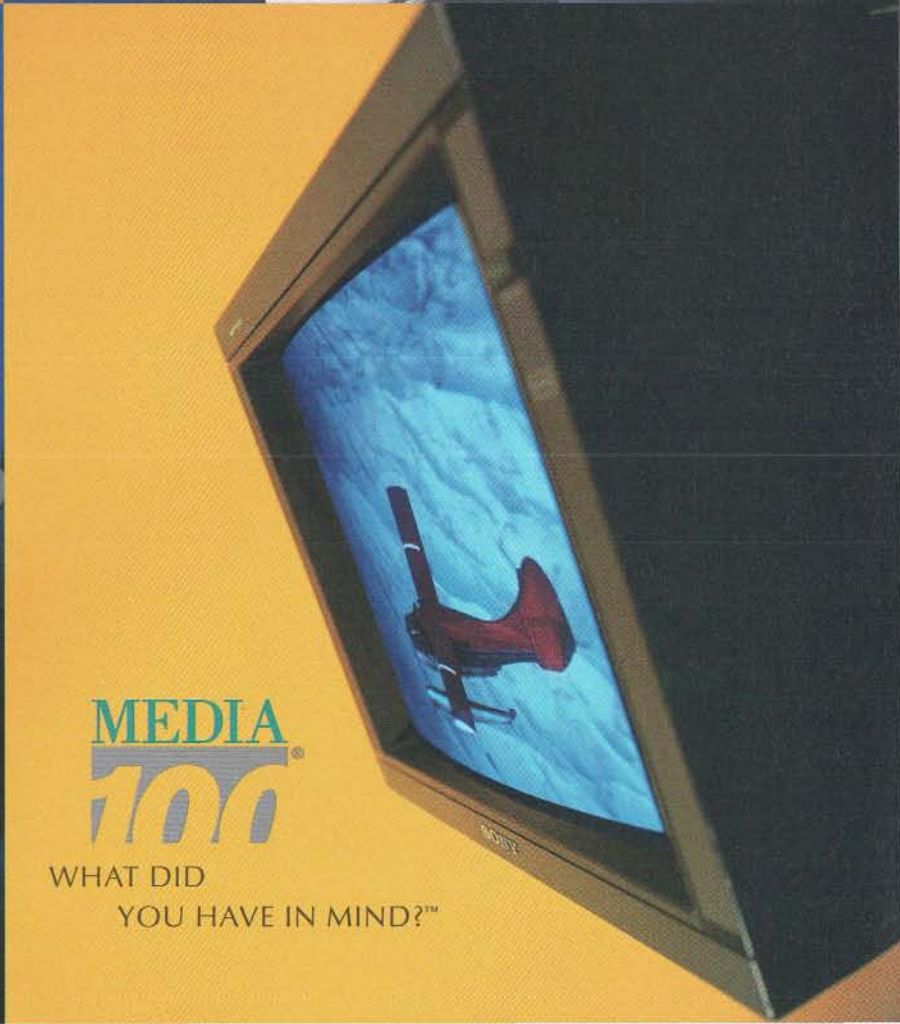
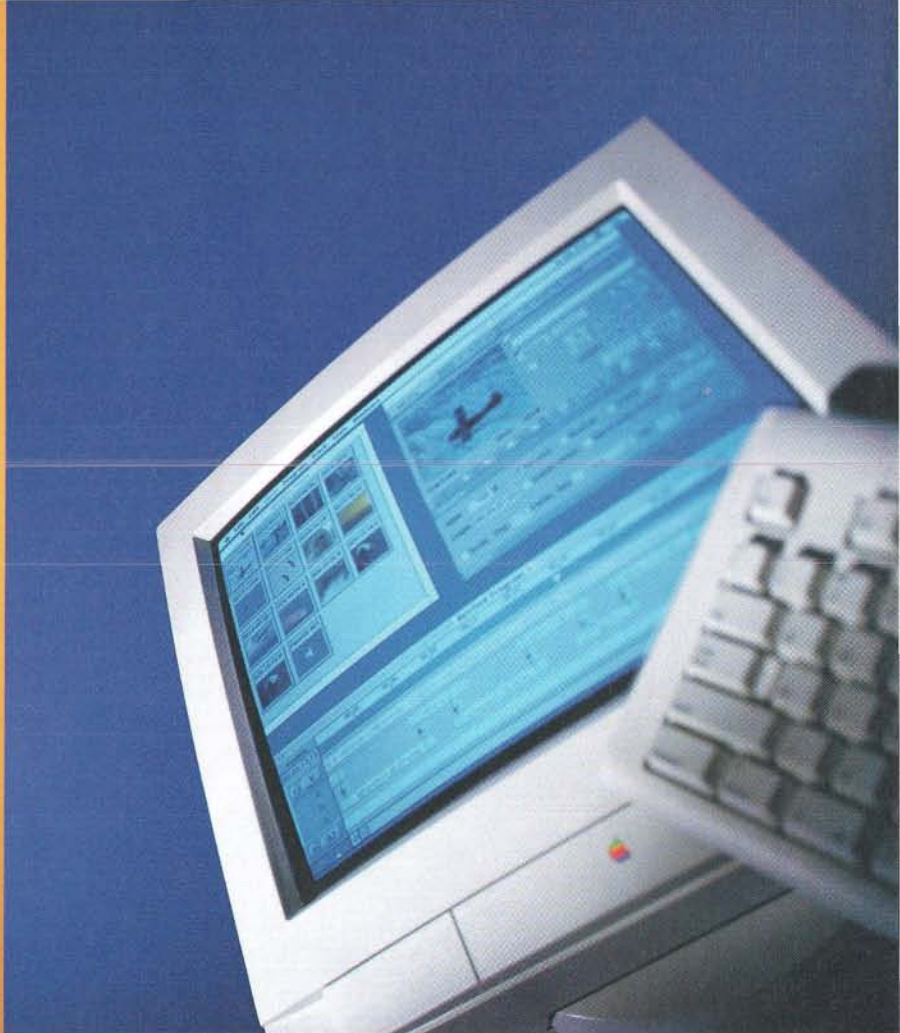
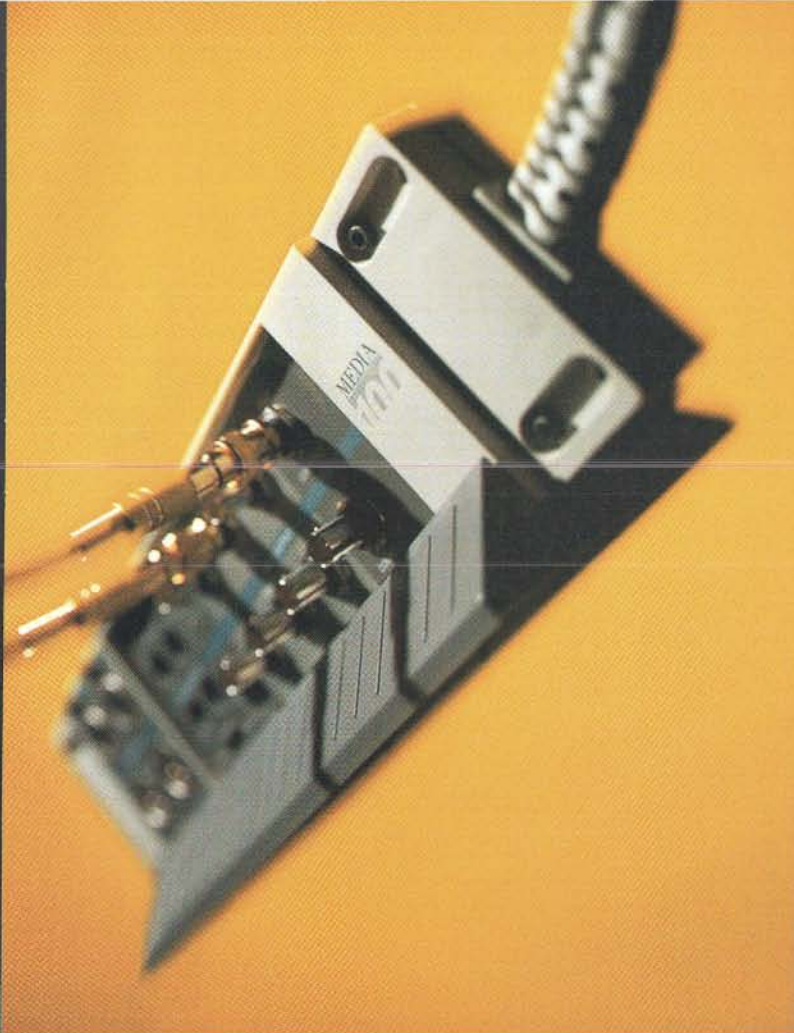
You see, this new Media 100 xs is quite simply the ultimate machine for post-production professionals.

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Wiring the Maine Line

Wedged between spent soda tanks and boxes of recyclables whirs a 486 clone that for two years has hosted the only local Internet service in Newport, Maine. Marc "Grouch" Warren bought the Tandy in October 1993 to balance the books at his pub. Within months he'd racked up a four-digit phone bill calling Virginia to reach America Online. Annoyed by the huge bills, Warren decided to download some BBS software to begin offering connections himself. Though the pub now sits vacant – a relic of former rowdiness – Grouchy Marx, the BBS,

canoes," he says, "but the citizens of Newport can't afford to buy them. We could find a market for them on the Web."

Warren speaks so quietly his words seem taxed, but he became a public figure in his effort to wire Newport. He gave classes and made house calls. He posted public notices and the library's card catalog online. Some 250 people signed on with Grouchy Marx, but much of Newport saw little value – and some

Warren is newly married and expecting a child soon. "I'd like to find a way to stay," he says. "Newport is real Maine. It would be great if people would just open up a little and let me do this." – *Laura Conway*

In tiny Newport, Maine, the locals are hoping to find a market for their products on the Web.

continues to hum in Warren's new joint, a combination bar, store, restaurant, and barbershop.

Newport, a central Maine town of 3,000, is a rough-and-tumble place where the houses cluster to fend off the cold. The town was never a bright light, and what economic shine it once had has since faded. The local mill is considering layoffs, and logging work in the area often leads to crushed hands and broken backs. Warren, who is 30, thinks the Internet could encourage members of his generation to stay in Newport. "People here make handmade

threat – in the digital unknown. "People are afraid to call me," Warren says. "People used to ask, 'What stops somebody from calling back and breaking into my computer?'"

Even so, Grouchy Marx has brought commerce to town.

Hugh Flye's record shop, a whistle from Warren's emporium, has fewer square feet than a horse stall. Flye uses Grouchy Marx to reach beyond Newport's borders and keep his shop alive. "Grouch sends out my product list when he does a mail run," Flye says. By combining direct mailings with BBS ads, Flye has sold records to Net users in Ireland, Denmark, Austria, and Slovenia.



Marc Warren: Maine's online backwoodsman.



Henry Panion: Music technology guru.

Stevie Shakes the Giving Tree

When Stevie Wonder starts referring to you as "Dr. Music," you've got to be doing something right. Henry Panion, chair of the University of Alabama at Birmingham's music department, has been working with Wonder for the past four years, accompanying him on his Natural Wonder tour as an arranger and conductor. Wonder has now returned the

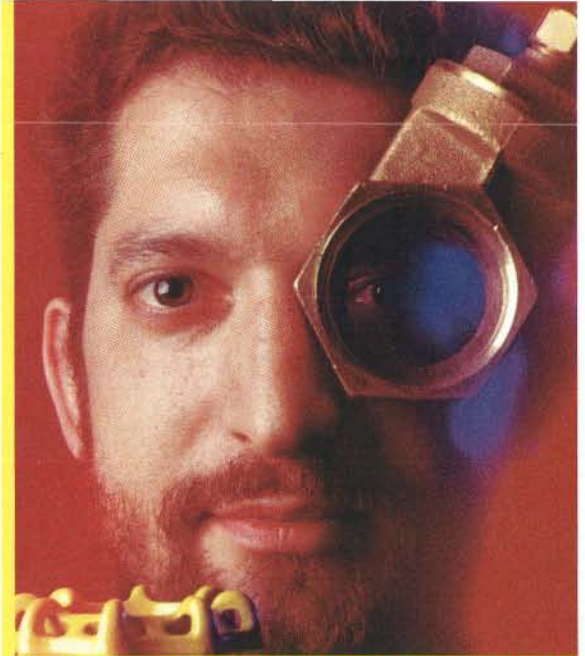
favor with a benefit concert, the proceeds of which will go toward creating the Stevie Wonder Center for Computing in the Arts as well as scholarships. The university, with seasoned music technology veteran Panion at the helm, will be one of only a handful of schools that offer a degree in music technology.

– *Kristin Lowe*

Art Shutoff Valve

Bill Karsh makes his living writing Macintosh source code, so when his wife saw him waiting a dog's age just to get on America Online, she demanded, "Why don't you do something about it?" Within hours, Karsh wrote a script that blocks new art downloads from AOL and replaces them with generic icons. Dubbed ArtValve, the Mac shareware eliminates the long wait for exploring art-intensive areas. At first, corporate AOL complained about ArtValve, but the company has allowed Karsh to distribute his new 2.1 version on the Mac Utilities Forum.

"Not many people mail me the US\$5 price of the shareware," Karsh admits. "I just enjoy looking for ways to circumvent AOL problems." — Bob Parks



Bill Karsh: Your Roto-Rooter man for AOL art downloads.

Scuttlebutt Scanners

While media pundits haggle over whether the Internet is a communications or publishing medium,

Alexander and eWatch can help.

EWatch, the first clipping service on the Net, trolls newsgroups, mail-

partner of eWorks!, the Minneapolis-based startup that created eWatch, believes that customers crave a filter for the Net.

Subscribers who sign up for eWatch's basic service at US\$295 per month can specify 10 search terms they want to monitor. EWatch then tracks usage of the search terms in all newsgroups and mailing lists and returns one report a day to the customer. For an

it straight from the customer's mouth."

Alexander says his business has been going like "gangbusters" since it was picked up by PRNewswire, Luce Online, and RTV Reports last year. Thus far, eWatch has garnered more than 200 clients, over half of which are Fortune 500 firms.

More will surely follow soon, if any lesson is to be learned from the Intel debacle that took place in 1994. Back

EWatch is the first clipping service for the Net.

additional \$95, eWatch will also search proprietary services such as America Online or CompuServe.

Kristina Jonell, webmaster for U S West, thinks eWatch clippings are much more valuable than those delivered by a print media clipping service. "It's not a reporter making these comments about us," she says. "You're hearing

then, the credibility of the world's largest manufacturer of microprocessors was damaged by newsgroup postings about flaws in the Pentium processor — a near-catastrophe that might have been avoided if Intel had paid attention to what people were saying and then moved quickly to address the problem. A word to the wise — keep your eye on the E. — Roderick Simpson

Jargon Watch

Deboning The act of removing bound-in subscription cards, cardstock ad pages, and "blow in" cards from a magazine to make it easier to read.

Dilberted To be exploited and oppressed by your boss. Derived from the experiences of Dilbert, the geek-in-hell comic strip character. "I've been dilberted again. The old man revised the specs for the fourth time this week."

Link Rot The process by which links on a Web page become obsolete as the sites they're connected to change location or die.

Object Value In industrial design, a measure of consumers' immediate desire for an object, even before they know or understand what it does. "Gassée may be nuts, but at least the BeBox has great object value."

Swiped Out An ATM or credit card that has been rendered useless because the magnetic strip is worn away by extensive use at gas pumps, grocery checkouts, and bank machines. "We wanted to stop for suds, but my card was swiped out and I couldn't get cash."

— Gareth Branwyn (jargon@wired.com)
Tip o' the space helmet to Steve Lamsens, Mandy Thomas, Peter Goggin, and Mike Mikula.



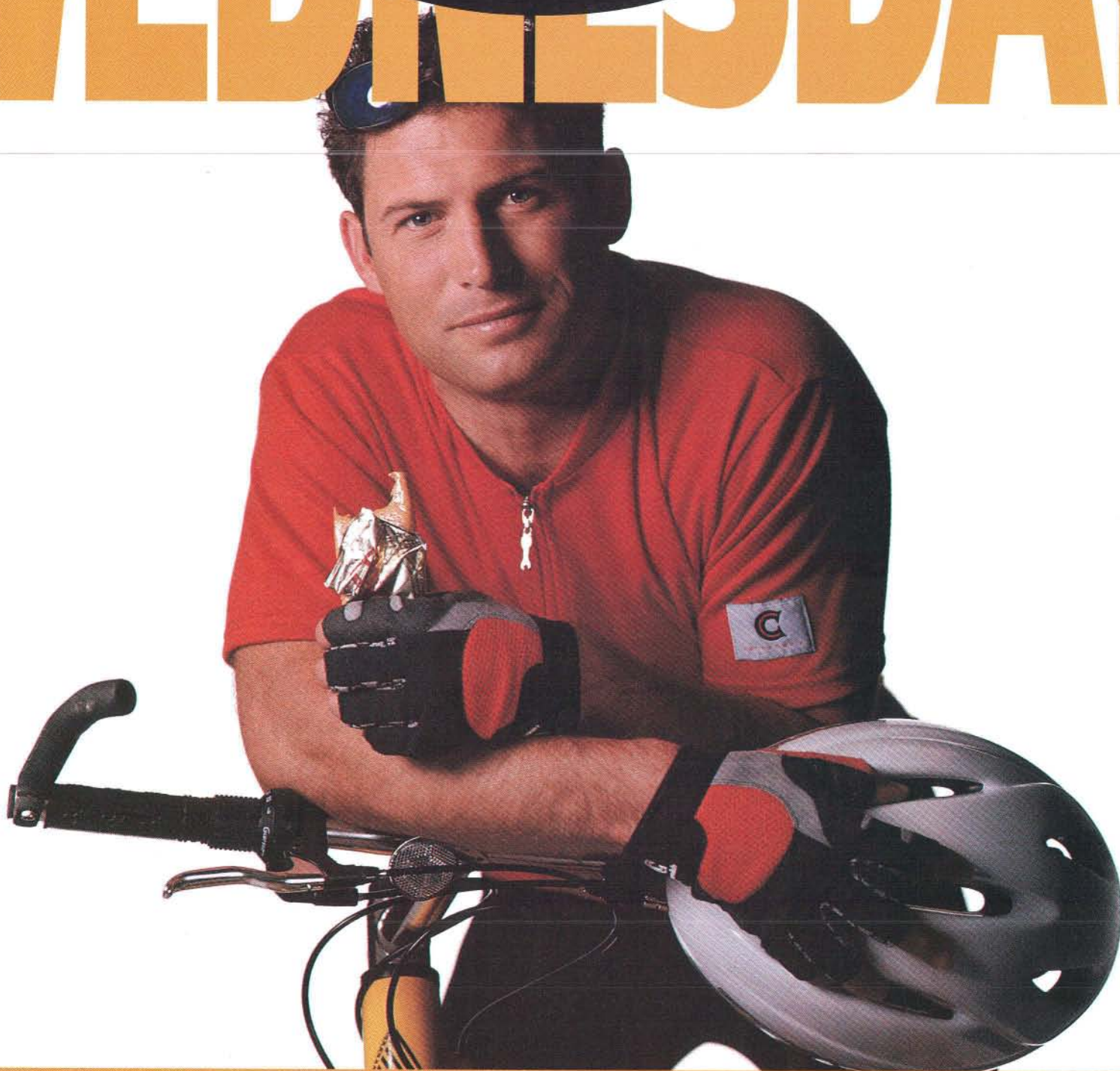
James Alexander: An eye on the virtual back fence.

millions continue to use it as they always have — for communicating and publishing. But for companies trying to keep a watchful eye on what's being said about them, all this muddled interaction can become a major headache. James

Alexander, managing ing lists, and proprietary online services in much the same way that companies like Burrelle's or Bacon's keep tabs on traditional print media, combing newspapers, magazines, and wire services for articles written about its clients.

WEDNESDAY

Be ready



"When I'm home in Utah during the off-season, I like to get away for a few hours by myself. I jump on my mountain bike and head for my 'secret' trail in the Wasatch Mountains. After I reach the summit, I kick back and enjoy



the view. And I'm always glad I had a PowerBar® Energy Bar before I started out. They're low in fat, high in nutrition and give me plenty of complex carbs for long-lasting energy. It's what I rely on every day -- especially Wednesday."

- STEVE YOUNG-

CHOCOLATE



MALT-NUT



WILD BERRY



APPLE-CINNAMON



BANANA



MOCHA

Calling for Christ

"We don't want to work with the secular world or anything that's not built around Christ," Carl Thompson, LifeLine's vice president, says



AmeriVision: Financing the kingdom of God, one call at a time.

emphatically into the phone. LifeLine, a program of AmeriVision, an Oklahoma City-based long distance company, donates 10 percent of its clients' monthly home phone bills to conservative Christian

causes such as Randall Terry's Operation Rescue and Pat Robertson's American Center of Law and Justice. By creating the first fully wired kingdom of God, Thompson dreams that his company can save America from the perils of moral turpitude. "Our goal is to change the world for Christ with every call," Thompson says.

Companies like LifeLine are

of God" after his daughter took him to church a few years ago. He says he took a job at Life-Line because it was what God wanted him to do. Now he leads Bible study at the company and derides homosexuals for "bringing destruction to millions of people." In its marketing efforts, LifeLine tries to draw customers from AT&T and MCI by bashing the telcos for

600,000 customers are dialing long distance to change the world for Christ.

among a growing number that have infused simple consumer transactions with political power and the promise of social change. Although such companies make up less than 5 percent of the long distance market, LifeLine has grown to more than 600,000 customers since its founding in 1991. Thompson claims that 40,000 to 50,000 customers sign up each month. By 1998, he hopes to serve 3.5 million customers — enough to donate US\$84 million a year to causes that "will turn America into a church-ruled nation."

A former atheist, Thompson says he "encountered the fear

supporting gays and lesbians through diversity training seminars and domestic partner benefits.

LifeLine's moral autonomy is so sacred that it decided to stop renting lines from long distance carrier Wiltel and bought its own switch for more than \$1 million. Thompson thinks it's worth it. "We want to use our own switches and our own networks, so we don't have to rely on the secular world," he boasts. "We're not here to make people like us. We're here to take over in the name of Jesus." — Rachel Lehmann-Haupt

Wired Top 10

Targets fired at by New York City police officers

Target	Number of Shots Fired	Number of Hits
1. Perpetrators	928	173
2. Dogs	155	111
3. Accidental discharge	43	17
4. Protecting other officer	18	10
5. Officer intoxicated	10	0
6. Suicide	8	8
7. Into locker	6	0
8. Vehicle	5	0
9. Girlfriend	3	3
10. Attempted suicide	3	2

Source: Firearms Discharge Assault Report for 1993, as reported in *Police* magazine, March 1995.

— Gareth Branwyn

Invisibly Interactive

Visible Interactive designs programs that don't hold the viewer's attention. The San Francisco-based company develops museum tours that provide audio and visual information on handheld Newton MessagePads without distracting patrons from the artwork they're studying. The tiny company has already customized its "pocket curators" for weighty venues such as "America's Smithsonian" and the National Air and Space Museum. Visible Interactive's Roland Deal says the goal is to make the computer seem like it's not even there. "What we want to be visible is the experience." — James Sullivan



CHRIST PHOTO: UPI/BETTMAN



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created
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Big Zeus Is

A sleek figure clad in a red, white, and blue suit approaches a guarded portal brandishing a javelin. Placing her hand under a high-frequency beam, an ominous voice sounds, "You have been permitted access. Please proceed." It's not the voice of an omniscient Greek god – it's the sound of the

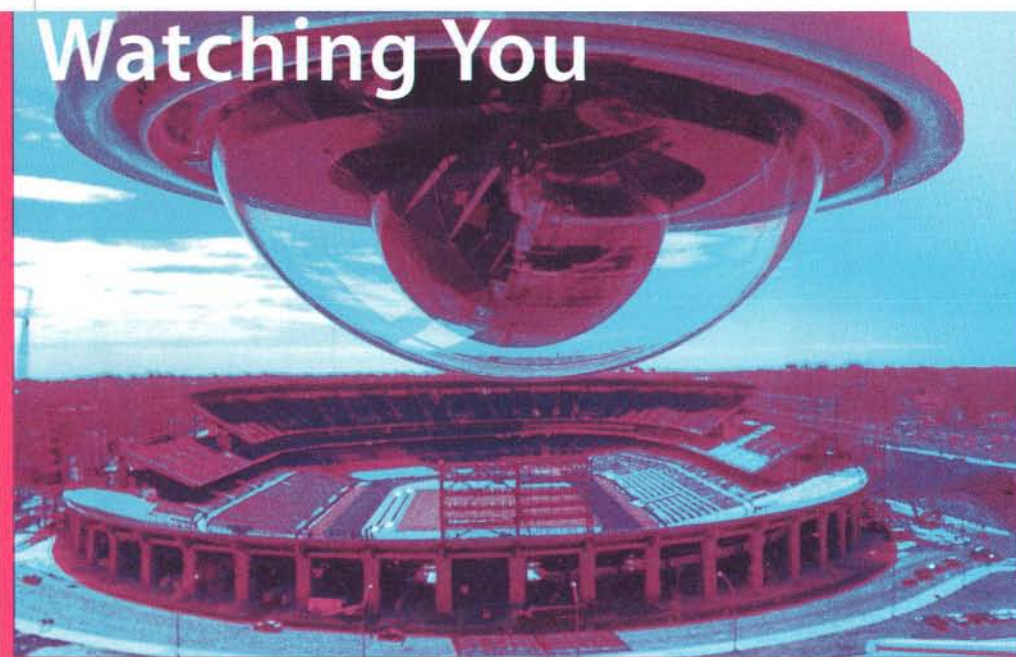
This summer in Atlanta, "you'll see less, but there will be more."

security machine running the 1996 Summer Olympic Games in Atlanta.

For hardcore technophiles, the Atlanta olympiad is a dream come true – an amazing showcase for advanced digital technology. But to the rest of us mortals, the games reek of Uncle Sam's security hysteria. Remote-control surveillance cameras will be everywhere, with monitors connected to databases at the Department of Defense and the FBI. Roaming security officials carrying radios that double as cell phones will monitor events on foot. Encrypted data lines will protect the security network from unauthorized intrusion.

But the star of the show will be Sensormatic, a Deerfield Beach, Florida-based electronic security company that has constructed a high-tech security system based on biometrics and smartcards. For the honor of providing this system,

Watching You



Atlanta 1996: Going for gold with electronic surveillance and high-tech security.

Sensormatic dished out US\$25 million – a figure that includes \$22 million for an in-kind donation of the most advanced automated security system in the world.

How does it work? As Jane Olympian approaches the security gate that separates the privileged few from the sweaty masses, she passes through an electronic field where antennae read the microchip on her badge. The chip allows access to the gate, and Jane steps through to a reader box identified

by the outline of two feet on the floor. When her palm is placed under the reader device, infrared light beams create a digital map of Jane's hand, relaying the data to a central database where it is checked for authenticity.

"Thanks to state-of-the-art electronic systems, these games will be safer and more convenient than ever," says Lyn May, director of communications for the 1996 Atlanta games. "You'll see less, but there will be more."

Watch your back and don't make any false moves this summer in Atlanta – the gods will be ruling with iron fists. – Hayley Nelson

SCANS



New Media Economics 101

Stop the presses! That's what the computer-savvy editors of *Temple News*, the 75-year-old student newspaper of Philadelphia's Temple University, decided after skyrocketing newsprint costs and plunging ad revenues rendered it fiscally impossible to sustain the paper's daily run of 10,000 copies. In March, *Temple News* migrated to the Web, becoming one of the first US school papers to go completely digital. Will most of the students be shut out by the switch? Managing Editor Adam Butler doesn't think so. "Two-thirds of the Temple student body already has campus-provided online accounts," he says. – Laura Linden *Temple News*, on the Web at astro.temple.edu/~kate/.

Distributed Objects for the Enterprise

BPCS Client/Server



Now you can bring the power of distributed object technology to your entire industrial sector enterprise. BPCS Client/Server utilizes SSA's Distributed Object Computing Architecture (DOCA®) to provide your organization the technical benefits of distributed object technology in your enterprise environment.

This proven object technology underlies BPCS Client/Server— the most robust and powerful application functionality available for industrial sector enterprise-wide systems. Now you can effectively integrate supply chain management, multi-mode manufacturing, electronic commerce, Internet, and global configurable financial applications in a distributed environment across your total enterprise.

SSA's DOCA is CORBA conformant, ensuring that SSA's software operates in compliance with the Object Management

Group's standards.

Interoperability with other CORBA conformant object applications is assured. The flexibility and configurability of a message based architecture is inherent in BPCS Client/Server.

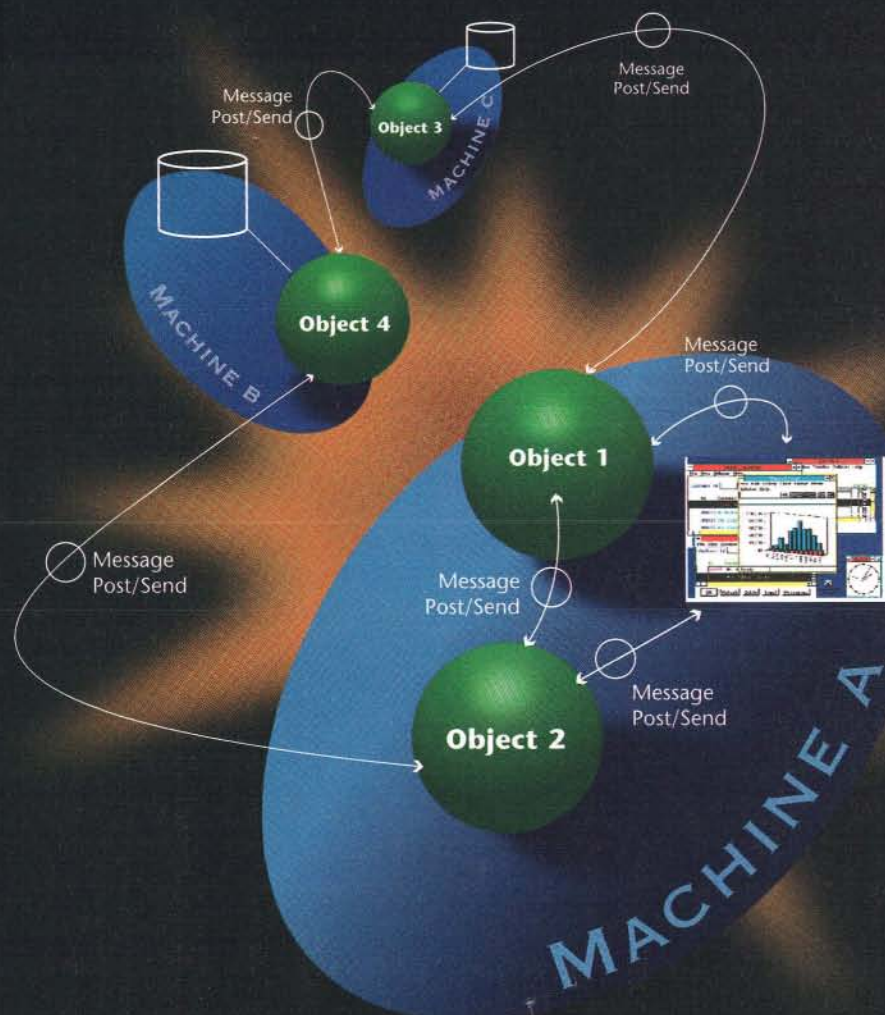
SSA's distributed object tool set— Object Development (ODW) Workbench — builds robust, state-of-the-art Client/Server applications. BPCS Client/Server includes drag and drop, embedded objects, and other third generation client/server user interface functions.

SSA is the world's largest object technology company, with planned 1996 revenues of well over \$500 million, 53 full service offices worldwide, and industry leading technology.

Shouldn't we be talking?

**DISTRIBUTED OBJECT
COMPUTING ARCHITECTURE
FOR THE TOTAL ENTERPRISE**

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The Future of Bathrooms

You've heard the hype.
We asked the experts.
Here's the *real* timetable.

Since the modern flush toilet was invented more than 100 years ago, American bathrooms haven't changed a great deal. Despite new loo technology – ranging from heated seats to home medical-care toilets that test bodily waste and modem results to your doctor – the public isn't quick to accept

innovation. Bathroom style, whether involving bidets or bathhouses, is a regional issue, and as anyone who chronically leaves the toilet seat up will tell you, old habits are hard to break. *Wired* asked six experts to cut through the crap and take a look at the future of bathrooms.

	Self-Cleaning Toilet	Bidets in US	Safe Bathtub	Medical-Testing Toilet
Geragi	unlikely	unlikely	1996	unlikely
Kira	2025	unlikely	2025	unlikely
Peterson	2010	2010	2000	2014
Warden	1994	1996	1996	2010
Wylde	2000	2005	2001	2006
Zaccai	2000	2000	1995	2010
Bottom Line	2009	2006	2002	2011

Nick Geragi

director of education,
National Kitchen and
Bath Association

Alexander Kira

professor of architecture
at Cornell University and
author of *The Bathroom*

Mary Jo Peterson

certified bathroom and
kitchen designer

Newbold Warden

marketing supervisor,
Toto Kiki USA Inc.

Margaret Wylde

PhD, president of Pro-
Matura Group and co-
author of *Building for
a Lifetime: The Design
and Construction of Fully
Accessible Homes*

Gianfranco Zaccai

president of Design
Continuum Inc., designer
and developer of the
Metaform Personal
Hygiene System for
Herman Miller Inc.

Keep listening to the Ty-D-Bol Man for now. Even though toilets that spray themselves after each use are making their way into rest rooms at gas stations and other public facilities, it will be some time before self-cleaning units catch on at home. Geragi notes that it's difficult to stay on the popular water-conservation path when designing a self-cleaning toilet, but Warden says that his company has already produced an anti-bacterial tile that kills the germs you can't see. Also on the market are sanitizing features such as auto-flush and automatic seat-cover changers, but in the end, Peterson points out, "Elbow grease is still required to maintain a toilet."

While bidets are standard bathroom fixtures in Europe, they have never really caught on in the United States. Wylde says one contributing factor could be that the US toilet paper industry "has spent zillions of dollars perfecting toilet paper that's soft, smells good, and is reasonably priced." Several of our experts expect that bidets will continue as a fashion statement among the affluent, while others predict that new high-tech toilets, incorporating bidet-style cleaning features, could find broader success in the US. "Being a European," Zaccai says, "it has always amazed me that people will wash their hands after going to the bathroom but are perfectly comfortable using just a piece of paper in other areas."

Each day, nearly 500 people are treated in emergency rooms for injuries that occur in bathtubs or showers. Though cushioned tubs, built-in seats, floor grips, and handrails are commercially available, they haven't been widely accepted in the mainstream market. Why? Wylde comments that safety-minded engineers often ignore aesthetics. "When product designers think safety, they also think 'for the handicapped,' and everything ends up either white or stainless steel," she says. Walk-in bathtubs equipped with side doors can be purchased, but in Geragi's opinion, the fact that "you have to get in naked with no water and sit there while it fills" isn't much of a selling point.

For certain medical conditions – diabetes, for example – regular tests of blood-sugar levels are lifelong requirements. Toilets that analyze urine and transmit results to your doctor via modem have already been developed to automate this process. While such com-modes exist mainly as prototypes today, they may become popular in the US market in the future. But, Zaccai notes, "manufacturers' liability issues must be seriously considered" before toilets start helping diagnose your medical conditions. And even if diagnostic johns do find favor in the marketplace, their ubiquity would be questionable. "It's a highly specialized device," Kira says. "But then again, bathrooms may go online along with everything else."

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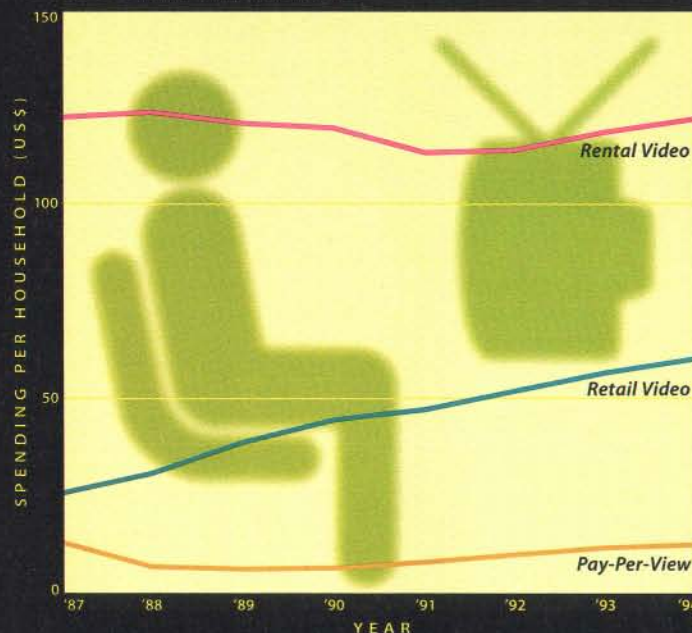


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In-Home Entertainment

Household spending on in-home entertainment has remained flat in the US, with overall growth spurred by an increase of VCR-owning households to 77 million in 1994. For new technologies like DVD and video-on-demand to take hold, consumers will have to be convinced to switch media. Their overall spending will likely not increase to include the new market segments.

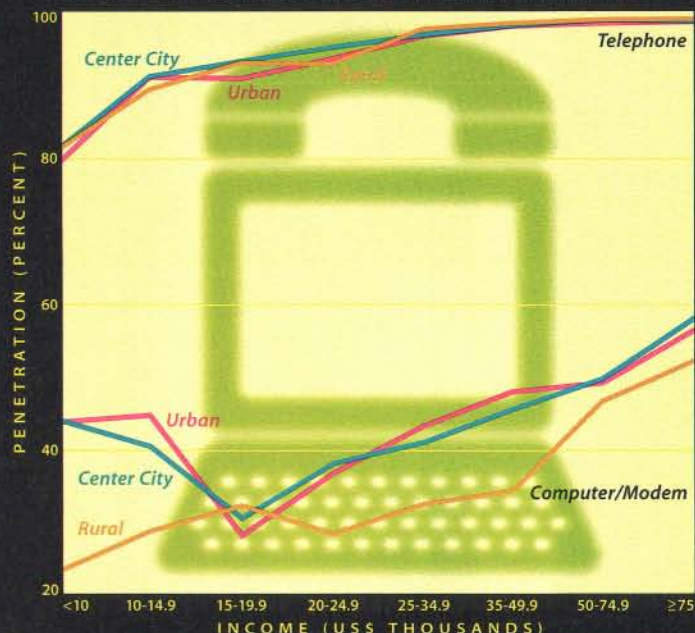
SOURCE: VERONIS, SUHLER & ASSOCIATES



The Have-Laters

Online penetration has far to go before reaching mass-market proportions, but the battle over the haves and have-laters rages on. While geography doesn't make much difference in whether or not one's wired, ethnicity has yet to be thoroughly investigated. Today, it's simply a question of economics – an obstacle not even the telcos' universal-service plans have overcome.

SOURCE: NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

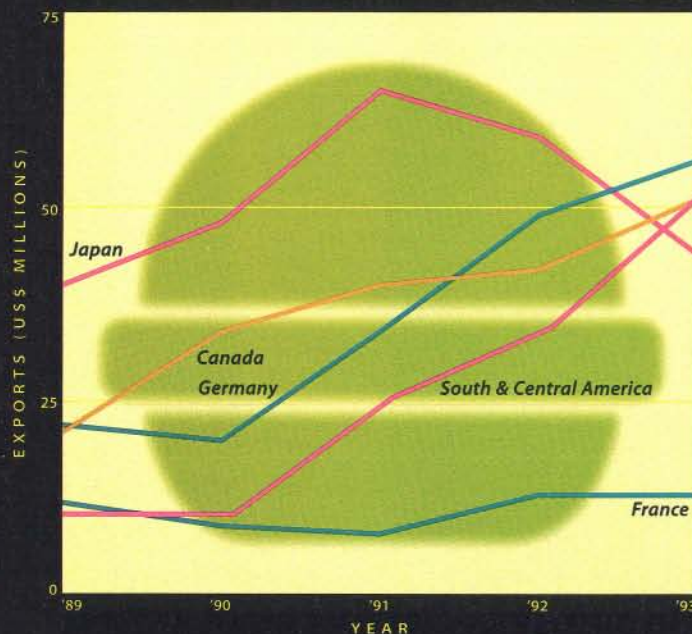


Edited by Tim Barkow

Franchising

It's the way America spreads its love around the world. As countries have embraced economic integration and reduced trade barriers, and as communications and transportation improve, franchising has loomed as a powerful capitalistic force. American franchise exports amounted to US\$408 million in 1993 as businesses discovered substantial growth abroad.

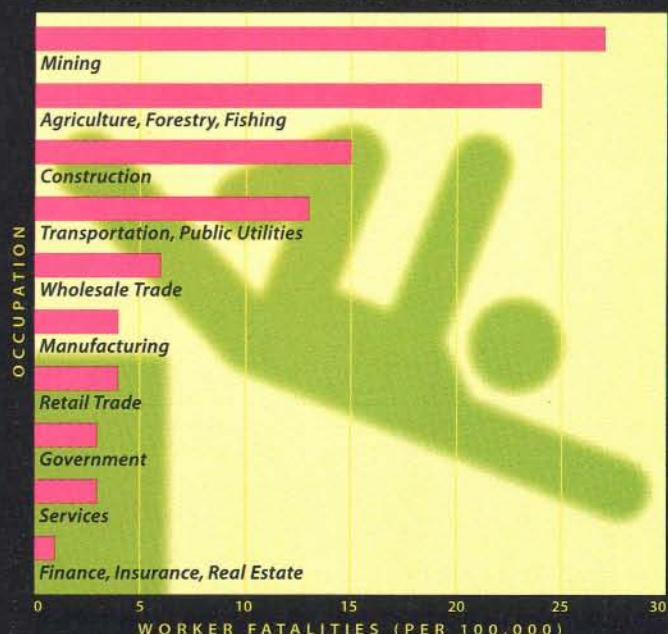
SOURCE: BUREAU OF ECONOMIC ANALYSIS, SURVEY OF CURRENT BUSINESS (SEPTEMBER 1994)



Fatal Occupational Injuries

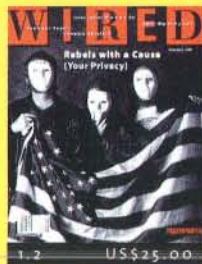
Summer's here and you probably aren't obsessing about safety in the workplace. But take a second and think before you make what could be a fatal career move. Mining, agriculture, driving a bus – anything that involves power tools or heavy machinery is out. And, surprisingly, you're better off taking that government job over any gig in retail. Who knew?

SOURCE: BUREAU OF LABOR STATISTICS, CENSUS OF FATAL OCCUPATIONAL INJURIES, 1994

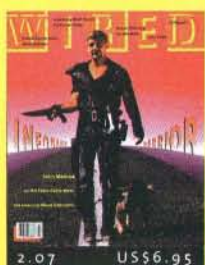


Is your set complete?

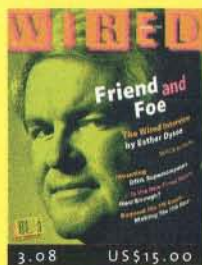
1993



1994



1995



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Digital Video Discs

Compact discs on steroids.

By Mark Fritz

Introduced in the early 1980s, even before the IBM PC, the compact disc gave many people their first taste of the digital age. Now this common medium of optical storage is being pumped up to higher capacity and positioned to replace the videotape the way it did the vinyl record.

The compact disc was – and still is – a marvel of microengineering. Stamped onto a single 1.2-mm-thick disc of polycarbonate (the same plastic used for eyeglass lenses) are more than 2 billion pairs of pits and lands, representing digital 1s and 0s. A popular misconception is that each pit represents a 1 and each land a 0. Actually, it is the transition – either from land to pit or pit to land – that represents a logical 1, while the absence of a transition represents a logical 0. These pits and lands are arranged over a reflective layer on the disc in a single continuous spiral that is wound so tight (about 40,000 tracks per centimeter) that a human hair would cover up more than 50 tracks.

The device that reads these discs, the CD player, is equally marvelous. Its two central features (housed together in the same tiny pickup head component) are a laser diode that casts an infrared beam across the pits and lands, and a pickup lens that gathers reflected light. Because lands reflect laser light directly and pits scatter it, together they create a pattern of strong and weak reflections as the disc spins. The pickup lens gathers the reflected light and directs it to a photodiode, which converts the pattern of light fluctuations to a pattern of voltage fluctuations. This digital data then goes through a digital-to-analog converter so it can be reproduced as sound waves by

an analog stereo system.

Some years after it wowed audiophiles, the CD was adapted for use as a computer storage medium and given the name CD-ROM (compact disc read-only memory). The main thing that differentiates an audio CD from a CD-ROM is the latter's need to set aside much more space on the disc for error-correction code, which ensures that something like a speck of dirt or a scratch on the disc doesn't change the accuracy with which the player reads the data.

Just about everyone was satisfied with the CD-ROM's 650-Mbyte capacity until the Hollywood studios got interested. Even with 200-to-1 compression supplied by the MPEG-1 algorithm, you could fit only 74 minutes of video on a standard-density disc. It was clear to everyone that higher-density discs were necessary. The result is the unified Digital Video Disc (DVD) spec, first introduced in December 1995.

Increasing the data capacity of the CD isn't really that difficult. For years, disc replicators have been demonstrating in their R&D labs that they can master CDs with densities up to 50 times greater than a regular CD. Essentially, making a denser CD means making the pits and lands smaller and closer together and winding the spiral tracks tighter (reducing the "track pitch").

The hard part is attaining backward compatibility, adapting CD-ROM players' capability to read both higher-density discs and standard audio discs. The real trick is to do so without significantly increasing manufacturing costs.

The biggest challenge for manufacturers of CD-ROM players is the development of better lasers. Think of a laser

beam as being like a spotlight. The spot has to be focused down tightly enough to hit one track's pits and lands without spilling onto those in adjacent tracks. The most direct way to get a narrower beam is to use a laser diode that generates light of a shorter wavelength.

Current CD-ROM players use an invisible-light infrared laser with a wavelength of 780 nanometers. The ideal would be a blue-light laser, since blue light has a much shorter wavelength. But after nearly a decade of research, a compact and affordable blue-light laser diode remains elusive.

Consequently, electronics engineers have turned their attention toward less ambitious improvements. DVD researchers have settled on two types of visible-red laser diodes that produce beams with wavelengths of either 635 or 650 nm. Such diodes, found in many industrial barcode scanners, are already available.

Another important factor in adapting a drive to higher density is the focusing power of the lens. A lens's light-focusing capacity is measured by a value known as numerical aperture (NA). A standard CD-ROM uses a lens with an NA of 0.45. The DVD spec increases NA requirements to 0.6. Most electronics engineers agree that this is about as far as you can push NA without significantly beefing up fault tolerances in the player mechanism.

By combining an incremental decrease in laser wavelength with an incremental increase in lens quality, DVD players will be capable of reading discs seven times the density of normal discs.

For even greater capacity, bonded – or double-sided – DVDs are planned, which means users will have to turn

their discs over manually. Though double-sided DVDs essentially will be two discs glued back-to-back the way laserdiscs are, it's debatable whether they would take hold in the marketplace.

Another doubling method under investigation is to stack two up-facing pit/land data layers within the same plastic. The layers are separated by a special semitransparent photopolymer. This photopolymer is reflective enough to direct the laser light from the first data layer back to the pickup lens but transparent enough to allow light through to the next data layer below. This requires an adjustable pickup lens to refocus from one layer to the next – a minimal engineering challenge, since current pickups already move slightly to compensate for disc warpage.

However, because the laser signal is unavoidably degraded as it passes through the semitransparent photopolymer, the double-layer method requires that the second layer be slightly less dense than the first. Therefore, while the double-sided disc will increase a regular disc's total capacity from 4.7 to 9.4 Gbytes, the dual-layer disc will have a capacity slightly less than double (8.5 Gbytes).

Of course, eventually the CD will be rendered obsolete by some new technology – the most promising ones include "frequency domain" optical laser systems and data holography. But for the short term, higher-density discs will help carry us – and a lot of our data – into the next century. ■ ■ ■

Mark Fritz (74447.265@compuserve.com) designs CD-ROM video training applications for VIS Development.

Standard CD-ROM
(650 megabytes)

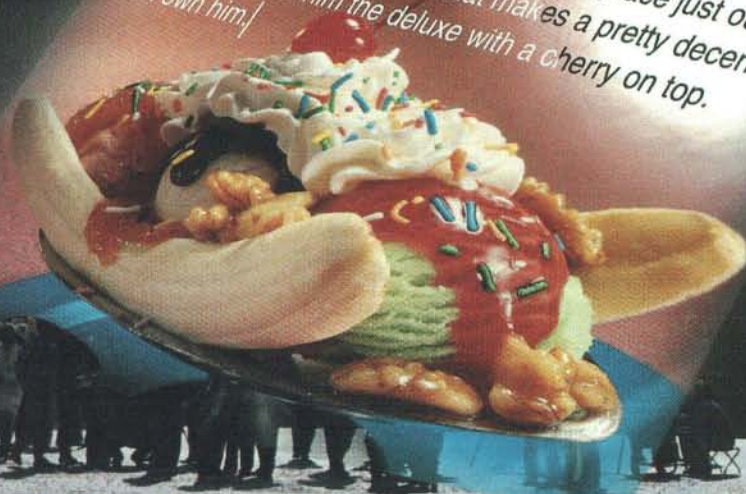


DVD Dual-Layer
Configuration
(8.5 gigabytes)



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Charlie -- Sergei seems to be driving a hard bargain. We need to play to his weaknesses, of which he has two -- American dollars and American ice cream. Promise him the former and feed him the latter. There's a place just outside the Kievskaya Metro Station that makes a pretty decent banana split. Get him the deluxe with a cherry on top. We'll own him.



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Bargains and Blowoffs

If the Dow Jones industrial average fell as much as the Philadelphia semiconductor index has since last September, it would be at 3,000. Talk about a bear market! It's easy to find

By Michael Murphy semiconductor stocks

down 50 to 70 percent from their 1995 highs. Institutional investors won't touch them until they see the PC inventory surplus liquidated, the semiconductor book-to-bill ratio turned up, and sequential quarterly earnings on the rise.

do have very low yields – 1 percent or so. That's not a problem for most tech investors, who focus more on capital appreciation than on current income. But some investors, such as trust funds, have special income or growth requirements. Other investors just want to hedge their bets a bit. I figure that convertible bonds capture about 85 percent of the reward in the common stock with only 50 percent of the risk.

About 100 technology convertible bonds are available.

At that point, investors will have made 23 percent on the bond plus 6.75 percent in annual interest while they held it. On the other hand, if the common stock sinks to say, \$46 a share, the bond should decline only 7 percent or so.

Speculative blowoff

About 75 percent of all tech IPO stocks fall *below* their offering price during their first year of trading. So *why* do investors move heaven and earth to get shares in an IPO? Because investment bankers deliberately price initial public offerings about 15 percent below what they think the stock is worth. A stock that opens up 15 to 20 percent makes everyone happy. The company gets a large amount of new capital at a much lower cost than it would pay venture capitalists. The investment bankers don't get stuck with stock that is dropping in price. The new investors make 15 percent or more in one day

– a nice annual rate of return if you can keep it up – and they will presumably remember the company with fondness if and when it needs to sell stock again.

The IPO market is cyclical. When it's depressed, only the very best companies can go public – even then, only if they accept low valuations. As the market warms up, quality diminishes and valuations increase. Soon, some underwriter will take on a company that has never had a profitable year of operation, and the IPO will be successful. Then someone else will successfully underwrite a company that's never even had a profitable quarter. After that, the market goes into a speculative blowoff with a flood of early-stage, unprofitable, concept-company IPOs.

That's pretty much where we stand today. Internet, communi-

cations, and software companies with no history of turning a profit – and often no plans to do so – are doing IPOs at absurdly high valuations. In early April, three of the major Internet search engine companies went public in very successful offerings. With at least a dozen major public competitors and several dozen smaller private ones, I wonder if they'll even get 20 percent market share each. Yahoo! could grow 100 percent a year for 9 years and still not have revenues larger than the \$848 million market value the company had after the first day of trading.

These manias usually last six to nine months and always end badly. In 1983, the proliferation of disk drive IPOs dragged down the whole technology sector. In 1993, the crack in multimedia IPOs didn't spread beyond that segment. Let's hope the same is true for the inevitable smash in Internet software offerings.

TWITS

I'm buying 17,000 shares or a 9 percent position in Euphonix, which makes the audio equivalent of a wordprocessor – a digital front end that controls the 4,000 possible settings of an audio mixing board.

I'm also buying 7,000 shares in Diamond Multimedia, a leading producer of add-on multimedia boards who will benefit greatly as PC users upgrade to take advantage of the Internet. Although Intel will continue to build basic add-on functions onto the chip, Diamond can keep integrating such high-end functions as 3-D graphics and video encoding. ■ ■ ■

Michael Murphy is a money manager who publishes the California Technology Stock Letter in Half Moon Bay, California.

The Wired Interactive Technology Fund (TWITS)

Company	Primary Business	Symbol	Shares	Price Apr 1	Δ Since Mar 1	Action
LSI Logic Corporation	Semiconductors	LSI	7,800	36 1/4	+ 9 1/4	hold
Applied Materials Inc.	Semiconductor equip.	AMAT	4,000	39 1/4	+ 3 1/4	hold
The Walt Disney Company	Entertainment	DIS	1,500	60 1/2	- 4 1/4	hold
Apple Computer Company	Hw/sw	AAPL	4,800	24 1/4	- 1 1/4	hold
Tele-Communications Inc.	Cable television	TCOM	4,800	19 1/4	+ 1 1/4	hold
Intel Corporation	Microchips	INTC	3,500	67 1/4	+ 10 1/4	hold
Adobe Systems Inc.	Software	ADBE	5,000	42 1/4	+ 9 1/4	hold
Mattson Technology	Semiconductor equip.	MTSN	30,000	15	+ 1 1/4	hold
New Stocks						
Euphonix	Audio sw	EUPH	17,000		+ 9 1/4	buy
Diamond Multimedia	Multimedia hw	DIMD	7,000		+ 21 1/4	buy
Portfolio Value	\$1,942,193.75	(+94.22% overall)			+11.66%	

Legend: This fund started with US\$1 million on December 1, 1994. We are trading on a monthly basis, so profits and losses will be reflected monthly, with profits reinvested in the fund or in new stocks.

TWITS is a model established by *Wired*, not an officially traded portfolio. Michael Murphy is a professional money manager who may have a personal interest in stocks listed in TWITS or mentioned in this column. *Wired* readers who use this information for investment decisions do so at their own risk.

These conditions should be met by the time second quarter earnings are reported in July.

That means now is the time to shop for bargains. Look for companies with rapid revenue growth (at least 15 percent annually over the last three years) and high profit margins (at least 15 percent pretax) after spending at least 7 percent of revenues on R&D. Many stocks meet these standards, including Intel, Cirrus Logic, Integrated Device Technology, Cypress Semiconductor, and LSI Logic. The only chip stocks to avoid are the DRAM makers (Micron and Texas Instruments) whose prices have plummeted more than most.

Riding convertibles

Most technology stocks don't pay dividends, and those that

They pay up to 8 percent interest and can be converted into the stock of growing companies with good prospects in the digital economy. Convertibles go up as the company's common stock rises. However, if the common stock drops, the convertible initially follows suit but then levels out, supported by the investment value of the bond based on its interest payment. That's how the risk is halved.

When Seagate Technology acquired Conner Peripherals, Seagate took over two Conner convertible bonds. One – a 6.75 percent coupon that matures in 2001 – is convertible into Seagate common stock at US\$65.60 a share. I expect Seagate to redeem this bond early, probably when the company's common stock reaches \$85.

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The Silicon Circuit

If you want the dish on Palo Alto – from the **Dish** in the foothills to the hot and spicy chicken at **Jing Jing** – get out your *Wired* 4.06 and turn to page 80, where you'll find a guide to the city. Consider this column your escape route.

To the north lies San Francisco, the cosmopolitan tip of the peninsula. You can get there on Caltrain, which drops you at the corner of Fourth and Townsend Streets, an area of ugly industrial buildings and loft spaces known as Multi-media Gulch. This is San Francisco's Silicon Valley. Walk up Third Street to the ultraslick, new **San Francisco Museum of Modern Art**. The collection is second-rate, but the building is a masterpiece – although the translucent bridge on the fifth floor is not for the acrophobic.

Walk over to nearby **Lulu** for some iron-skillet-roasted mussels from the wood-burn-

Continue west down Highway 84, winding through the hills of the coastal range all the way to the Pacific. Pack a picnic from the abundant **Whole Foods Market** deli in Palo Alto and lunch on San Gregorio Beach. Or travel south down Highway 1 to Pescadero, a rural town with infinite atmosphere and one stop sign, for a meal of artichoke soup and crab sandwiches at **Duarte's**.

Due south of Palo Alto, inland from Santa Cruz, cruise the cities and suburbs of Siliconia. In San Jose, tour the hokey **Winchester Mystery House**. Built by the paranoid rifle heiress Sarah Winchester, it's a bizarre labyrinth of 160 hidden rooms, stairs leading nowhere, and eavesdropping ducts (a 19th-century wiretapping technique).

More advanced technologies are on view at **The Tech Museum of Innovation**. Marvel at the 16-foot by 12-foot

ing oven. Or try a fantastical meal at **Flying Saucer** in the funky Mission District; the chocolate praline mousse will blow your mind (while the bill will blow your budget!). Or just grab a few franks at a Giants game at **Candlestick Park** before heading back to the peninsula. And the woods.

Drive northwest from Palo Alto up Page Mill Road to Skyline Boulevard, then veer north to its intersection with Highway 84, where you will find vittles and ambience at **Alice's Restaurant**, a friendly biker bar that's jumping on weekend afternoons. Alternately, you can head west on Highway 84 into La Honda to **Apple Jack's**, a Hell's Angels hangout with loud tunes and lots of local color.

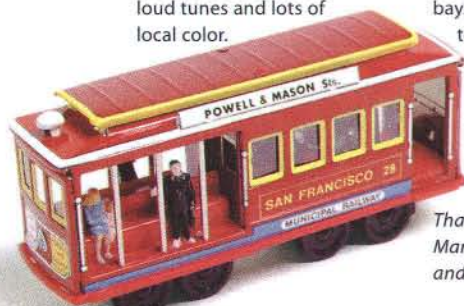
Imaginative Chip sculpture, a billiard-ball model of the movement of information through an integrated circuit. And test your knowledge at the *Bits & Pieces: Inside the Computer* exhibit. If you score well, treat yourself to the Grand Marnier soufflé at the elegant **Emile's**. Or try one of the 3,000 eateries across the Valley listed on the Web at www.w3.com/bayfood/ba_rest_guide.html.

You don't want to miss the **WeirdStuff Warehouse**, a die-hard collector's bargain basement of hardware, software, and other computer miscellany. This is an integral stop on the southern circuit.

Escape to the east and, well, you'll quickly bump into the bay. Then again, you don't have to escape from Palo Alto at all. From **The Scientific Revolution** to the **Rodin Sculpture Garden**, there is more than enough to do.

– Jessie Scanlon

Thanks to chipper sources Marla Aufmuth, June Cohen, and Kristin Spence.



WIRED JULY 1996

The Current Roundup (see *Wired* 4.06)

July 14-18 FutureVision: Ideas, Insights, and Strategies; Washington, DC. **July 26-28** DEF CON IV; Las Vegas. • **July 28-30** Spotlight; Laguna Niguel, California. • **July 28-31** Genetic Programming 1996 Conference; Stanford, California. • **August 4-9** Siggraph 96; New Orleans. • **August 8-10** ONE ISPCON; San Francisco.

August 18-20 **Hot Chips; Stanford, California** The silicon will still be hot on the circuits presented at this IEEE Symposium on High-Performance Chip Architectures. See the graphics chips that will bring the Net into 3-D, high-performance memory chips, logic chips, DSP chips, and more. Registration: US\$240 through July 21, \$290 after. Contact: +1 (415) 941 6699, on the Web at www.hot.org/hotchips/.

August 19-21 **Surveillance Expo '96; McLean, Virginia** Highlights of this NCSA-sponsored expo on surveillance and countersurveillance include the eye-opening early-bird panels (firsthand reports on countering corporate espionage) and the continuing debate on the death of Vincent Foster. The latest spook toys will be on exhibit. Registration: US\$295, half-day seminars \$100 each, open admission to exhibits. Contact: +1 (703) 450 2200, on the Web at www.rosseng.com/.

September 2-7 **Ars Electronica Festival; Linz, Austria** This year's event coincides with the opening of the Ars Electronica Center – a museum of the future. This premier European festival will focus on the culture of memes and the development of digital tools, as well as the dazzling art created by them. Registration: S1,200 (around US\$120). Contact: +43 (732) 712121 0, email info@aec.at, on the Web at www.aec.at/fest/fest.html.

September 5-6 **InfoWarCon '96; Arlington, Virginia** Words may never hurt you, but an electromagnetic pulse generator that erases your hard

disk will do some damage. Industry suits and rumped academics, not to mention the brass, will attend this fifth annual forum to discuss personal privacy, industrial security, and international information warfare and terrorism. Registration: US\$545 through July 31, \$595 after. Contact: +1 (717) 258 1816, email infowar96@ncsa.com, on the Web at www.ncsa.com/.

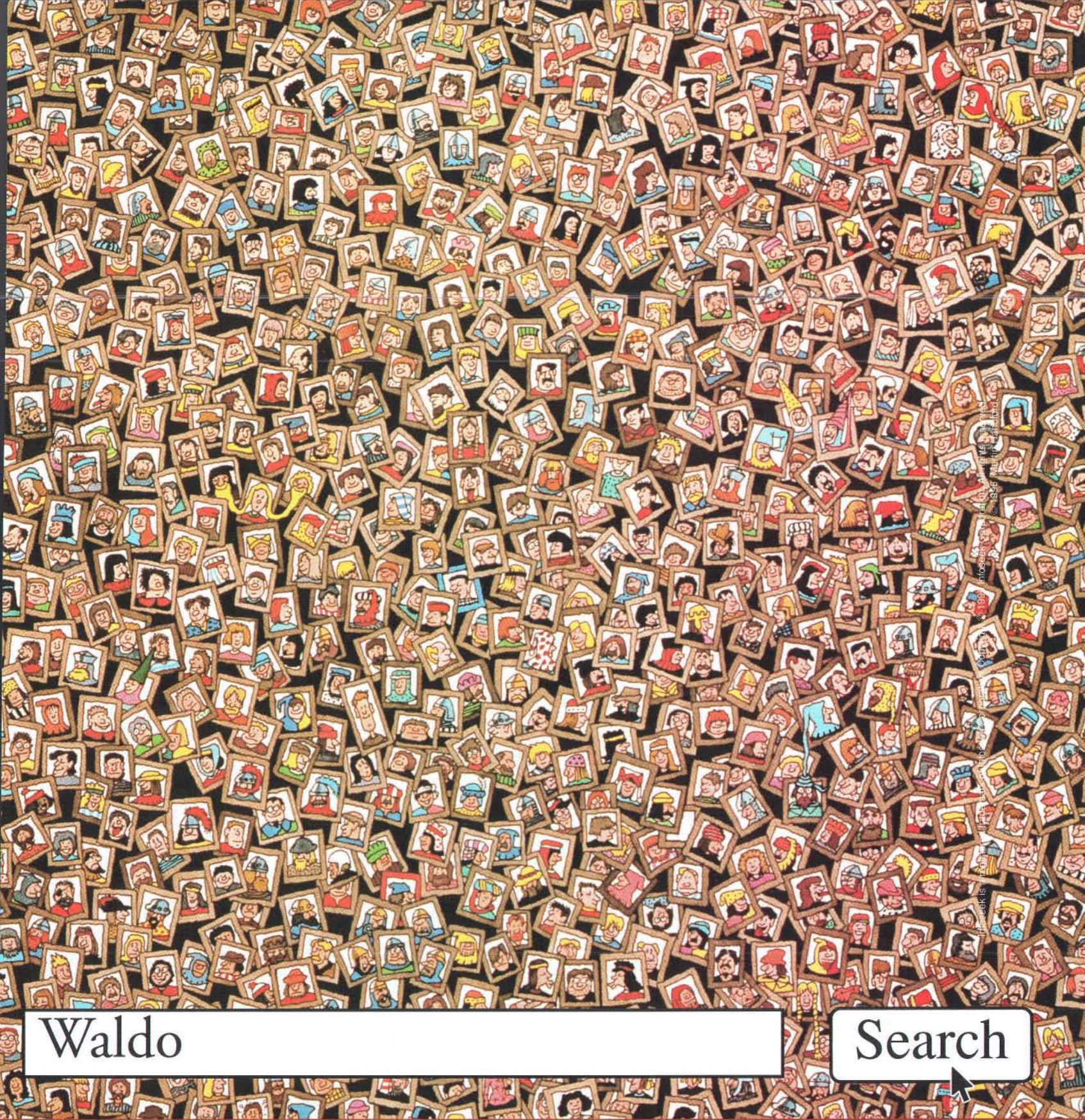
September 9-13 **From Animals to Animats – The Fourth International Conference on Simulation of Adaptive Behavior; North Falmouth, Massachusetts** Researchers in artificial intelligence, robotics, psychology, and ecology will flock to this forum-by-the-sea (Turing towels in hand) to discuss theoretical models, present computer simulations, and demo robots. Consciousness guru Daniel Dennett is one just one of the conference highlights. Registration: Price unavailable at press time. Contact: email sab96@cs.brandeis.edu, on the Web at www.cs.brandeis.edu/conferences/sab96/.

September 11-14 **International Workshop on Computational Humor; Enschede, The Netherlands** This fairly academic workshop focuses on humor and its relation to human and artificial intelligence. Douglas Hofstadter, Marvin Minsky, and other speakers will present theories of irony and discuss humorous aspects of human-machine interaction. Registration: Dfl300 (around US\$200). Contact: +31 (53) 4893740, email hoogvlie@cs.utwente.nl, on the Web at www.seti.cs.utwente.nl/~joris/IWCH/.

Out on the Range:

September 17 Advanced Surveillance Technologies II; Ottawa, Canada. Contact: email pi@privacy.org. • **September 16-20** ISEA96; Rotterdam, The Netherlands. Contact: telephone/fax +31 (10) 4778605, email isea96@hro.nl. **September 18-20** Online Developers III; San Francisco. Contact: (800) 481 1212, on the Web at www.jup.com/html/conf/upc/index.html.

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The Mouse Stops Here

Mice should know their limits. Or so thinks Bruce "Tog" Tognazzini, founder of Apple's Human Interface Group. He figures the mouse pointer should be confined to the edges of the window it's in, enabling users to skate to the tool bars quickly, without overshooting. To exit a window, users would apply force to a pressure-sensitive mouse, which would efficiently scoot the cursor under the window frame. Synaptics, a San Jose-based maker of computer-input devices, agrees.

Beating the competition to the punch, Synaptics will include this function as an option in the next version of the driver for TouchPad – a touch-sensitive device becoming common on many laptops. With more than a million TouchPads shipped, Synaptics may soon have many of us pushing hard to escape from windows.

[ORIGINAL STORY IN WIRED 3.09, PAGE 134.]

Cryptical Envelopment

On September 20, 2000, US Patent 4,405,829 will expire, promptly giving RSA Data Security's anxious competitors a chance to peek at five of their 15 most coveted encryption algorithms. But Jim Bidzos, president of RSA, isn't losing any sleep.

Since January, the 41-year-old executive has been globe-trotting – cutting deals and forming partnerships – preparing for the inevitable day, he says, when the US government will ease encryption restrictions (which limit export of algorithms to 40-bit keys), thereby allowing RSA to sell its products worldwide.

Bidzos joined the struggling Redwood City, California-based RSA in 1986, recruited by its founders Ron Rivest, Adi Shamir, and Len Adleman. Since then, Bidzos has led the company into the black. In April, Security Dynamics Technologies Inc. signed a US\$200 million stock deal to purchase RSA as a wholly owned subsidiary. After topping \$11.7 million in sales for 1995, RSA's first quarter earnings at the time of the merger were up almost 800 percent over last year. "Losing the patent isn't going to change anything for us," says Bidzos. "A company is not going to risk the security of its products and customers just because some graduate student can do the work for a nickel cheaper."

Earlier this year, Bidzos established Japanese subsidiary Nihon RSA. Based in Tokyo, Nihon will market its digital signature technology – and eventually its encryption algorithms – to credit card companies and computer hardware developers. RSA will also hand off clients with subsidiaries in Japan, such as Netscape and IBM, to Nihon RSA, creating an instant royalty revenue flow for the new subsidiary.

In China, Bidzos clinched a partnership with the Ministry of Foreign Trade and Economic Cooperation (MOFTEC), which monitors all imports and exports. MOFTEC will use RSA's products to secure transactions over its networks. MOFTEC, however, is limited to 40-bit keys, which Bidzos says "are a bad idea" for security purposes. But he speculates that the Chinese could

replace the shorter keys with the longer, safer 129-bit standard. Additionally, Bidzos hopes his encryption tools will trickle over to the Chinese masses. "It seems inevitable that they will spill over into the private sector," he says, "creating environments where people can communicate without being concerned that the government is listening."

Competitors are clambering for a foothold in the exploding encryption market, which RSA dominates with more than 200 licensees, including AT&T, Oracle, Novell, and Microsoft. However, companies like Cylink Corp. are checking some of the RSA hype. Cylink is giving away its encryption software to developers royalty-free, counting on sales of its network security products for revenues. "There's going to be some real competition between RSA and Cylink," says Martin Hellman, Cylink consultant and co-inventor of the Diffie-Hellman key exchange, which Cylink uses for its security applications. Cylink, he says, has "the potential to blow RSA out of the water."

In further global maneuvers, in May Bidzos returned from Europe, where he investigated potential subsidiary sites in Switzerland and Belgium. "Ten years ago, you couldn't give this stuff away," Bidzos says. "The explosion surprises even me. Now, all of a sudden, we're in the middle of everything, and it's kind of fun." – Michael Behar

[RELATED WIRED STORIES: 3.08, PAGE 114; 4.03, PAGE 128.]



Fading Attraction?

On March 18, after releasing only four titles, Magnet Interactive radically retrenched. That day, all employees of the Washington, DC-based firm were summoned to a local hotel for a mandatory meeting. Workers were sent to one of two rooms: in one, CEO Basel Dalloul upbraided them for flawed productivity; in the other, COO Bill Schick fired everyone present. Said one ex-Magnet staffer, "We were given one week's severance and a slip of paper with the date of our exit interview."

Magnet PR flack Michelle Seebach countered, "It's really a good thing.... We're moving more toward online." To date, Magnet has created Web sites for clients such as National Geographic, Kellogg, and Mercedes-Benz. Even so, Magnet is 130 bodies lighter, and its software output has stalled. *Blue Star*, a US\$2 million albatross, so underwhelmed staffers they nicknamed it *Blow Star*.

[ORIGINAL STORY IN WIRED 3.11, PAGE 64.]



Profit or Perish?

By the end of 1996, the split will be complete: AT&T Bell Laboratories in Murray Hill, New Jersey, will become AT&T Laboratories and Lucent Technologies Bell Laboratories. This "strategic restructuring" of what was once the world's richest and largest private communications R&D lab has caused hand-wringing within the scientific community.

The new AT&T Labs,

headed by former Apple VP David Nagel, will be staffing up its research division to continue projects such as speech coding, cryptography, and PCS, whereas the new Bell Labs will draw on much of the US\$3 billion that Lucent raised in its April IPO to fund such ongoing projects as integrated circuits, optical components, and the Inferno operating system.

Some worry that big science is being taken

over by those who value profit over study. Bell's chief scientist Arno Penzias rejects the notion that pure scientific research is being sacrificed to market profitability, although the definition of pure science seems to be changing. "In the past," he argues, "we used to invent things.... But today it's the context that matters; it's how things fit together."

[ORIGINAL STORY IN WIRED 3.04, PAGE 124.]

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It's time for show-and-tell. Representative White is here to introduce his new Internet Caucus.

"I'm from Congress, I'm Here to Help"

By Representative Rick White

It was December 6, 1995, and the future of free speech on the Internet was on the line. I had to persuade 33 members of Congress packed into a small room of the Capitol to drop the

In the wake of this disaster, I spent several days trying to figure out what went wrong. I came up with several answers.

For one, pornography is a highly emotional issue. We all want to protect our children. I have four kids who surf the Net. My wife and I spend lots of time discussing what sites they can and can't visit. But this isn't a matter for federal bureaucrats to decide. My colleagues failed to realize there is no way for the United States government to effectively regulate content on the global Internet.

Second, the Net community got broadsided by the Communications Decency Act. Despite efforts to show Congress that there is a large constituency of voters who are concerned about the future of the Internet, the message wasn't strong enough to counter the sophisticated lobbying efforts of CDA supporters.

But the real reason we lost this battle is painfully straightforward. Most of my colleagues just don't understand what the Internet is all about.

When you get right down to it, Congress is lost in cyberspace. Most legislators here rarely turn on a computer, so it should come as little surprise that they don't understand the democratic implications of sending email, publishing on the Web, or posting to Usenet newsgroups. And while it's easy to bash Congress for passing a bad law, the bottom line is that we're never going to get good laws until we get our legislators up to speed on Net issues.

That's why I'm working hard to correct the situation.

In March, I formed a new organization called the Internet Caucus with 20 other members of Congress. Composed of Republicans and Democrats

drawn from the House and the Senate, the caucus represents a dedicated group of Net-savvy legislators who are determined to raise Congress's consciousness about the value of the Internet.

Our goals are clear. We want to get more members of Congress online. We want to educate them about the uniqueness of the Internet. We want to serve as a focal point for interacting with Net users so their voices will be heard. (You can visit our Web site at www.house.gov/white/internet_caucus/netcauc.html.) And finally, we want to identify members of Congress who will make the case for why we need enlightened policy solutions for this vibrant new medium.

Since the CDA fiasco, netizens have done a tremendous job of taking their case to Congress. From the Internet Day of Protest to snail mail and phone campaigns directed at member offices, the Net community sent a clear message to Congress—we can no longer afford to ignore the concerns of our cyberconstituents.

But the debate over the CDA also showed us how much Net users need a friend in Congress. Like it or not, Congress will be passing lots of Internet-related laws during the months ahead. Legislation dealing with encryption policy, copyright protection, and I-phone regulation is already in the works. I don't want to lose any more battles by one vote. And with your support and the help of the Internet Caucus, I expect we'll win some. ■ ■ ■

Representative Rick White (R-Washington) hails from the high-tech corridor of the Puget Sound region. He can be reached at repwhite@hr.house.gov.

The Witch-Hunt Begins

Although the courts have yet to hand down a ruling on the (un)constitutionality of the Communications Decency Act, the far right is already using the law to impose its morality on the rest of us. On April 1, 1996, the American Family Association—a Mississippi fundamentalist group—sent a letter to Attorney General Janet Reno demanding that the DOJ launch a criminal investigation of CompuServe. The letter alleges that the company is offering "sexually oriented material on its online service to its users, including children" and urges Reno to "have an investigator review material available to children on CompuServe and take appropriate action."

Joined in Privacy

Wired magazine is proud to have joined the Internet Privacy Coalition—a new group formed to support your right to communicate privately. Spearheaded by the Electronic Privacy Information Center with support from cryptogurus Phil Zimmermann and Matt Blaze, the coalition is dedicated to promoting privacy and security on the Internet by expanding the availability of strong encryption. For more information about the coalition and efforts to safeguard your privacy rights, check out the IPC Web page at www.privacy.org/ipc/.

CYBER RIGHTS NOW

Social Insecurity

From the "don't worry about the government" file: This spring, federal prosecutors busted a credit card fraud scheme in which Social Security Administration employees transferred personal information about 11,000 taxpayers to ringleaders working on the outside. The pilfered information—which included Social Security numbers and mothers' maiden names—was then used to activate Citibank credit cards stolen from the mail. With civil servants like this, who needs a "hacker menace" to fuel the fires of techno-anxiety?



Remember when you were young and idealistic (this may have only been a few months ago) and you promised yourself that when you finally arrived, you would never become one of "them"? (Oh, you know who they are.)

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Computer Insect

www.wired.com/4.07/sinobug/

In Chinese, they're called *diannao chong*, or literally, "computer insects." In English, we call them hackers, software pirates, rip-off merchants, or geeks-on-the-make with Chinese characteristics.

By Sang Ye Translated by Geremie R. Barmé

In Beijing, computer insects congregate in the university district near the northwest corner of the Chinese capital. It's a part of town that most Chinese refer to as "Electronics Street" (Dianzi yitiao jie), but for the pros, the pirates, and the hackers, it's called "Thieves Alley" (Pianzi yitiao jie), plain and simple.

Only one syllable differentiates the two names in Chinese, but that subtle switch is enough to span the gulf between the party line and the gritty truth – the virtual from the real.

Thieves Alley is a haven for China's massive software pirating industry, and this is an interview with a master of the trade. He's

in his early 20s and wears gray suit pants, Adidas, and a bomber jacket – the uniform of young entrepreneurs in Beijing. A handsome young man with a biting tongue and quick wit, he's always at the ready to answer his mobile phone. He calls himself one of the Four Heavenly Kings of Hacking, and he's got enough attitude and ego to make the title stick.

From his mouth pours the brash, in-your-face voice of contemporary China. It's the voice of a nation proud of its 5,000-year-old culture, but acutely aware that this culture has been humiliated by more than a century of technological backwardness, political decay, and imperialist aggression. The message is unambiguous and unapologetic: We're here. We're mean. Get used to it.

This interview was conducted by Sang Ye, who has been interviewing Chinese citizens whose backgrounds, professions, and attitudes reflect the emerging "post-Deng" ambience of the People's Republic – a nation

that is increasingly self-assertive but ideologically adrift. His interview with this computer insect is part of that project.

The place was Beijing. The time, February 1995.
– Geremie R. Barmé

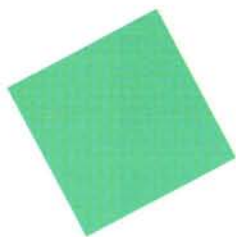
I studied at Qinghua University, specializing in computer databases. It was boring as hell, and I barely managed to avoid turning into a machine myself. DBP, DBA – it's all about data-based machines. That wasn't for me, so I dumped it and hooked up with a small company to get some money together. If you specialize, you just end up in some government research job or working for a big company. It might sound all right, but at best you can make only a few hundred yuan (US\$36) a month. It's chicken feed, and you end up sitting in front of a machine all day long. You've got to be kidding!

At my present company, or rather, at *our* company, I'm the development manager. That means I manage my own development. There are only 10 people in this company; one boss, eight managers, and that secretary sitting there. She's called the office manager. We've all got fancy titles. It's good for business, and our main business is selling hardware. Small companies like ours can only push software by selling hardware. Although I've got a reputation as a pirate, that's really my after-hours career.

I've been with this company for more than a year. The pay is OK, a steady two grand (US\$240) a month. But there's not always stuff around to pirate – not stuff that'll make a profit. A program like CCHD 6.0 contains more than 1,000 ready-made 3-D images of interiors. A licensed copy sells for RMB2,700 (US\$323). But I can strip it down in over an hour and make as many copies as I want. Actually, I was working on that a few days ago. I was doing it for a friend, so I charged only RMB6,000 (US\$718), less than my normal fee.

It was cheap at that price. My friend can sell my pirated version for ages and make back what he spent on me many times over. To employ me for an hour costs about RMB100 (US\$12); the rest went to buy my skill. If it was someone else, they might not

Away from the negotiating table, China's real attitude toward intellectual property is revealing itself on the streets of Beijing. The computer insects are ready for a fight. Get used to it.

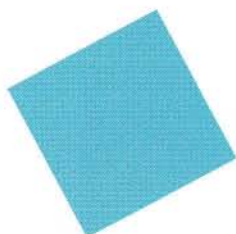


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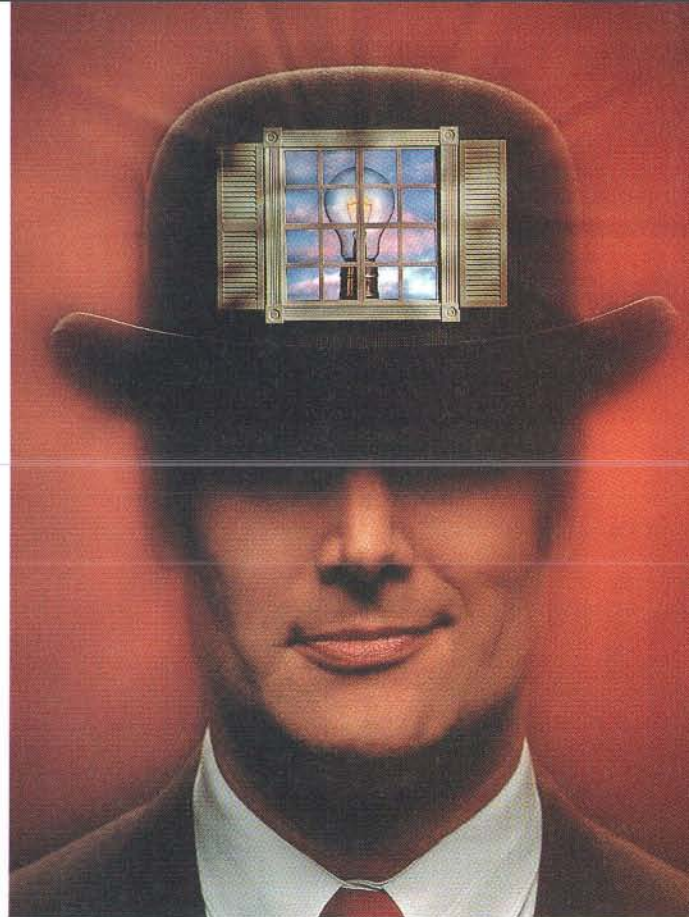


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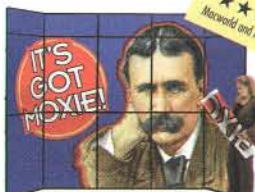
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have been able to break the program code even in 10,000 hours. Anyway, I didn't learn what I know for free. I have to make back the money I invested in going to university.

The way I see it, pirating software is no big deal. Hong Kong, Taiwan, Korea, and Singapore created all their wealth and prosperity by pirating. Tell me what those little shits in Hong Kong have ever invented? Zilch. They're just a bunch of pseudo-foreign devils who started out as tailors and cobblers. Everything they know about computers comes from having learned how to pirate stuff.

PCs are made up of parts from everywhere. Open up any machine and you'll find components manufactured in a pile of different countries. Plus there are always a few things without any labels made by guerrilla outfits. It's the same for software. I rip you off, then you rip me off. Popular software products – regardless of who developed them – all contain some fishy things. So much intermarriage has gone on over the years that nowadays everyone's related.

It's ridiculous for these stinking foreigners to pick on China like they do. We're just following the general trend by pirating some of their stuff. And they're up in arms, carrying on about intellectual property infringement and making a fuckin' stink all over the world about us.

Foreign devils are just plain unreason-

hardware aspect of all this.

And what about electricity and magnetic fields? Who discovered magnetism? Pardon me, it was the Chinese! Then what are you supposed to do with your data? How do you record it? You need hard copy after all. Well, it's obvious, you need paper to print a hard copy and without Cai Lun (the legendary Chinese inventor of paper), those foreigners would still be writing on parchment. Can you cut parchment into A4 size and print on it? No way! These fucking foreigners don't have a clue. They can't face up to the fact that they owe *us* for copyright infringement. When we were advanced, they ripped us off left, right, and center. Now that they've managed to get ahead, they won't let us have a go. As soon as they struck it rich, they began lording over everyone else. Well, I'm going to go right on copying whatever comes my way.

They can hit China with as many sanctions as they want. Besides, they're only punishing the central government; it can't touch any of us. At least the foreign devils got that right – the Chinese government is the one to go after. Boy, do they make a heap from pirating! You can make a bundle if you pirate really clever software. But only the government can get away with it. I couldn't copy programs for heavy-duty machines, even if I wanted to. I don't have any originals to work with, nor do I have the know-how, equipment,

The foreign devils owe *us* for copyright infringement.

When we were advanced, they ripped us off left, right, and center. Now they won't let us have a go.

able. To be honest, they've been ripping off the Chinese for ages. What's all this stuff about intellectual property? Whose ancestors got everything going in the first place? I don't think there are any cut-and-dried answers, but just ask yourself: What's the basic element of computing? Binary notation! That's the theory of yin and yang. Everything in the universe is made up of yin and yang, and the Chinese discovered that. Let's forget the

or access to a market. I've got no alternative but to let the government make the real killing.

The government raided us a few days ago just to give the Yanks some face during the latest round of Sino-US intellectual property talks. Go for it! All they got was a few disks. We still have software coming out our ears. Our pigs were just putting on a show for the Yankee devils. If they really wanted to enforce a ban,



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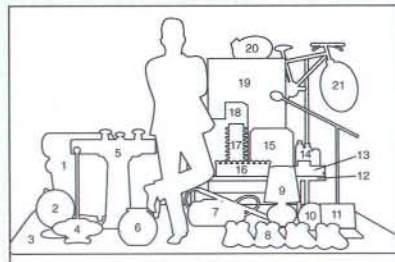
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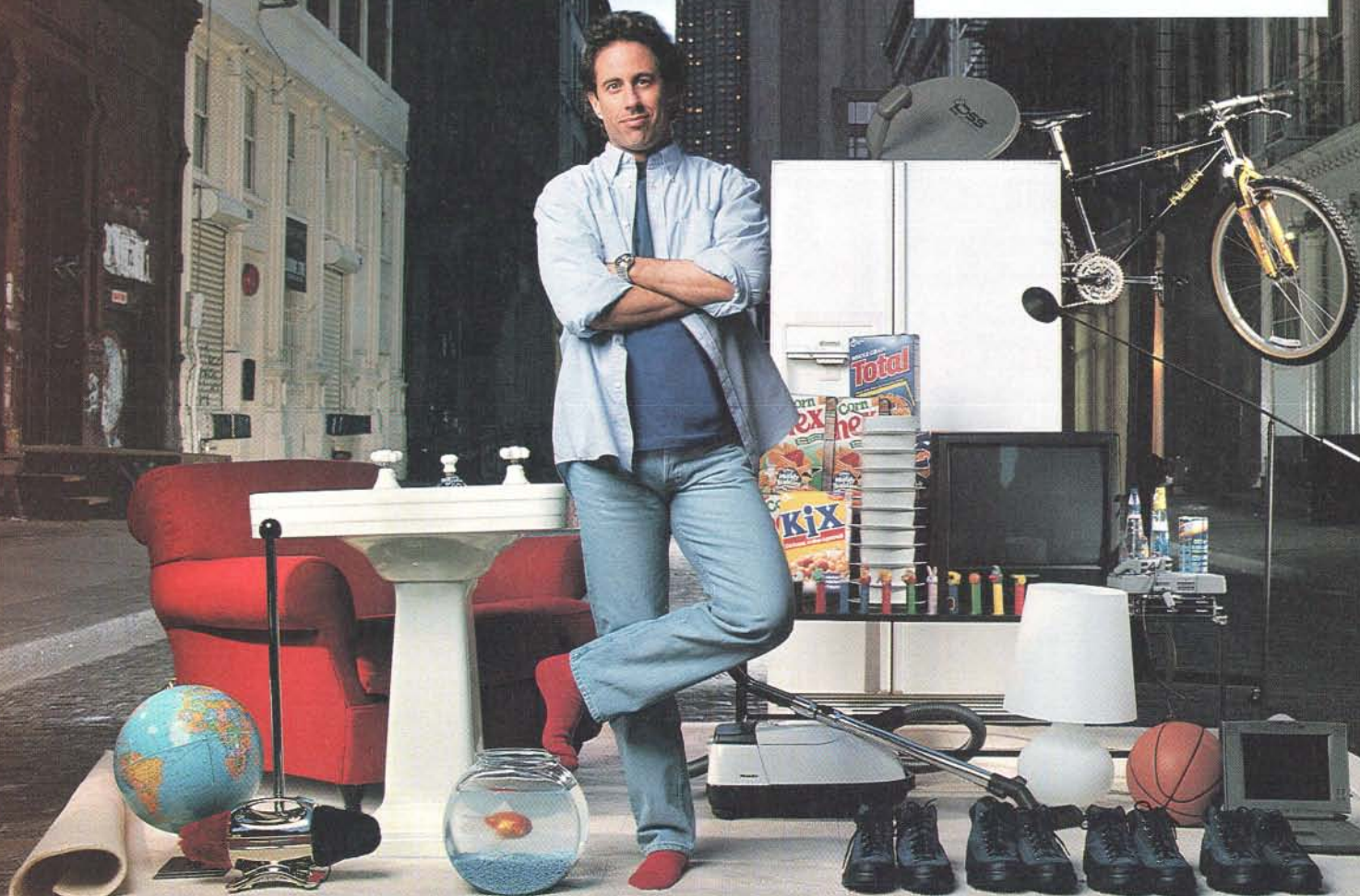
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they'd hit the National Defense Science, Technology, and Industry Commission or the Academy of Sciences. All we get are their leftovers. The government has been breaking the same laws we have. If they don't give a damn, why should we be scared? Besides, if they nabbed me I'd play dumb. I'd just say that I was ripping off the foreign devils to help the Communist Party save some money on advanced technology from abroad!

Everyone along Thieves Alley does the same thing. If we're selling to a government organization or state-owned company, we charge through the nose. What the heck? State-run companies aren't worried about money. As long as their middlemen get a commission, you can do what you want. Small private companies are more uptight about the bottom line, but it doesn't matter. They're computer illiterate, so you can tell them they need a pile of software and they'll believe you.

Once, there was this company that got a 386 SX clone and thought they'd be real cool by running Windows. But obviously, Windows can't do much all by itself. They came crying to us that they needed top-of-

they want more hardware, too. Windows is a real money-spinner - everyone who gets it comes back for more.

My first job wasn't on Thieves Alley, it was with an advertising company in Beijing's Eastern District. That was back in 1992, while I was working my way through my third year at university. At the time, my dad was only making RMB200 to 300 (US\$24 to \$36) a month, and he saw me make a few grand for one night's work. It blew him away. He said to me, "You never know when you're going to make that much again, so you'd better not let your girlfriend spend it all." But he could tell I could make that kind of money easily, and he hated my guts for it. The old prick hasn't gone anywhere in life, and here was his little sperm, up and running.

I'm running all right. I'm making a killing, and I've got real street cred: they call me one of the Four Heavenly Kings of Hacking here in Beijing. My old man can't believe it.

Before I went to college, I didn't take much notice of people in my dad's generation. You can forgive them for not

The government has been breaking the same laws we have.

All we get are their leftovers.

If they don't give a damn, why should we be scared?

the-line English software. I was at a bit of a loose end at the time, so I helped our retail people do them over. I talked them into buying the full package: WordPerfect, Word, ClarisWorks, Lotus Notes, Excel, as well as the Chinese systems WPS and WPS-NT. Who cared if there was a lot of overlap? They all had different icons, so they looked pretty convincing.

Of course, we'd pirated the whole suite. We sell it for 10 percent of the retail price, or even less. We just have to sell more to make a profit. In fact, if you want Windows 3.11 and you bring your own disks, our company will charge only RMB10 (US\$1.20). Really, that's what we sell it for. It's one of our favorites - once customers get hooked, they have to come back for more software. If you're lucky,

knowing anything about computers, but I never spoke a common language with them. At the time of the June 4 incident back in 1989, I was in my last year of middle school. I went out to muck around in Tiananmen Square, but I didn't burn any military vehicles, let alone kill any of our blood brothers in the People's Liberation Army. Besides, only a fuckwit would ever admit to taking part in the riots.

My parents were freaking out because they were afraid I'd get into trouble in the square. "Politics is really complex," they said, "you don't understand." Fuck that for a joke. They didn't even stop to consider whether I'd been bitten by the politics bug in the first place. Those kids who got mixed up with politics were idiots or plain fools. Like I'd waste my time getting

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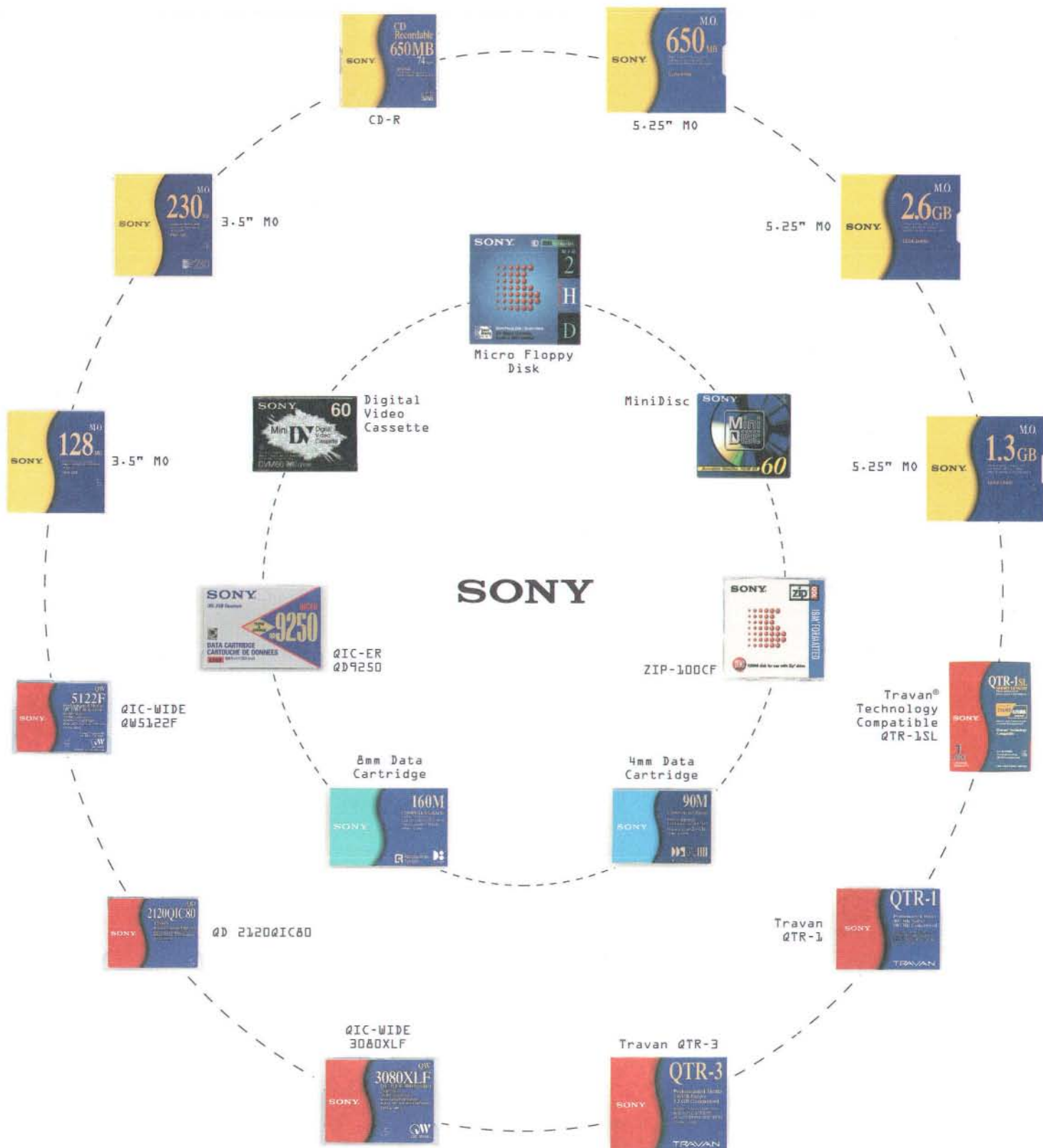
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involved with any of them?

When I started university, the Maoists were in favor. They made all college students do military training. We lived in army barracks for months. But the more training we got, the worse we became. Geez, the government is full of idiots. They're always talking about trying to reform the way people think. Well, that's pretty dumb, if you ask me. The way you think is already programmed in your head, like a big mess of documents. You might be working with a fucked up application, but it's got its own internal logic. It's impractical to try and change it according to some master plan, document by document. It's more labor intensive than starting all over again.

If I started acting like our shit-for-brains government and spent all my time trying to change things, then everything would always go wrong. I'd always be crashing. Then I'd change some more and crash again.

My approach is just to copy, without changing anything. I'll leave your mistakes where they are. I won't even touch the trademark. It's not worth changing things. I'll sell whatever the market wants. I just have to make sure I can out-sell everyone else.

Generally speaking, I've been in the right place at the right time. After my third year at university in 1992, I was pretty much free to do what I wanted. I had a chance to exploit my talents to the fullest. Didn't have to worry about a scholarship or finding a job. You have to rely on yourself, and that's just what I've been doing. That's why I'm different from my parents: I don't owe the Communist Party anything, and the party doesn't owe me. The party makes money their way; I make it mine. It's all money after all. We've just got a different approach.

I'm only responsible for myself. It's not my duty to save the nation or the People. I couldn't do it even if I wanted to. I'm clean and serene. All that propaganda about "the People sent you to university," or you should "serve the People" – it's a load of old crap. Couldn't even be bothered to ignore it. I got into university because I passed the entrance exams.

For me it was an investment, pure and simple. Once I graduated, I didn't have to pay anyone back.

We're not living in a moral society or a moral age. As the old saying goes, "Only when you have enough to eat and wear do you think of frugality and shame." We're at the stage of accumulating capital. We're going through a baptism of blood and fire. It's far too early to get onto a moral high horse. Anyway, I'm sick of being poor. This society's never given me anything, so I don't care what they say now. Sorry, it's too late.

Sure, sometimes I have pangs of conscience. Once I heard a talk by Wang Yongmin, a famous designer of Chinese-language programs. He told us that when he started out, he didn't even have a

people. Their lives suck. So they spend their leisure time reading about people screwing each other. Even in their free time, they pirate other people's lives.

I'd prefer not to go into much detail about my income. My salary's about RMB20,000 to 30,000 (US\$2,395 to \$3,592) a year. Then there's my gray income on top of that. I don't do too badly. I belong to the income group that can afford to buy a car but can't yet buy an apartment. Luckily, my girlfriend has a place of her own. Her dad works in the government housing administration, and he got it for her. We all have to live off what we've been given, and her family can get housing. Her dad can rip off housing, cars, and villas from the state. It's easy to do, and completely legal. That's

**The government is trying to reform the way people think.
But the way you think is like a big mess of documents.
It's impractical to try and change it according to a master plan.**

computer of his own. He had to get people to write out the programs in long-hand. Then he finally got some people in a state organization to let him use their equipment after hours. It was pretty moving stuff. All the people in the room were experts, so we knew what it meant to create a sophisticated Chinese-language program from nothing. If you had to do it all in longhand, it'd take the equivalent of 30 people years! But I got over being impressed and thought to myself, Heck, now this guy's a millionaire. If the opportunity comes my way, I'll rip off his software, too.

I'm better read than your average computer insect. I like reading and going to karaoke bars when I have the time. I've even read some Freud! But those brain-dead characters who waste their time in research institutes or big companies are satisfied to interface with machines all day long. If the authorities really want to wage a campaign against pornography, then they should go after those computer dweebs. All they know how to do is write programs. They have difficulty relating to

what they mean by the saying, "The dog that barks doesn't bite, while the dog that doesn't bark does."

Here, I'll give you a disk, you can use it as evidence against me. You're into IBMs; I'll give you an IBM disk, though of course I have Apple by the cartload too.

You really think I'm stupid enough to let you use my real name? If my name ever appears in print, I'll sue you for defamation.

Take a good look, these CDs are all pretty crude – there's lots of rubbish printed on the case. But don't worry: you won't find my name or the name of the real producer anywhere. In fact, you won't even find the words "Made in China." ■ ■ ■

Sang Ye is co-author of Chinese Lives: An Oral History of Contemporary China (Pantheon, 1987). Geremie R. Barmé (geremie@coombs.anu.edu.au) is a fellow at the Australian National University. His most recent book is Shades of Mao: The Posthumous Cult of the Great Leader (M. E. Sharpe, 1996).

To Surf and Protect

www.wired.com/4.07/cyberangels/

No age criteria. No training necessary. The only requirement: a desire to fight online criminals. Who are these CyberAngels – citizens performing a public service, or Boy Scouts gone haywire?

By Rogier van Bakel

Last summer, Colin Hatcher expanded his beat. As a volunteer with the Guardian Angels, he used to look for signs of street crimes in his native London, in New York, and in Los Angeles, the city he moved to in 1995. But then Colin and Curtis Sliwa, founder of the

band of volunteer crimefighters, decided another metropolis needed a few good men (and women): the Internet, which they call “the biggest city in the world.”

Their focus on the Internet started when Curtis got email and mentioned it on his WABC radio show. In short order, he was flooded with messages from concerned, sometimes desperate, computer users who complained of being harassed

combat rudeness, harassment, spamming, racism, and hate mail. They also say they’ll report evidence of software piracy, computer viruses, and terrorism. Predictably, the group has vowed mainly to go after online child pornographers, those semimythical bogeymen of the electronic age. Who are these CyberAngels – citizens performing a valuable public service, or Boy Scouts gone haywire?

Saint or saboteur?

It’s easy to take an immediate liking to Colin. He may display a massive inability to heed the clock – he is late for every single appointment I have with him for four consecutive days – but he gives off an air of friendliness and sincerity. He’s also a tireless verbal sparring partner. A 37-year-old martial arts expert and former history teacher who majored in English and drama, he’ll throw himself into long discussions happily, fending off criticism of the Angels like so many karate chops.

Colin hasn’t done much online patrolling lately. He’s been too busy dealing with new recruits and the material they forward to him. When I meet up with him in the Guardian Angels’ New York office, a roomy apartment on the Upper West Side, he shares his suspicions about a new member, a volunteer we’ll call John, who is extraordinarily zealous in his pursuit of Net criminals. So much so that maybe, just maybe, John could be a saboteur. “This guy is deluging us with stuff he finds,” says Colin, scrolling down his list of new mail. “I’ll give him the benefit of the doubt, because nothing he writes betrays any sarcasm or hostility, but I’m keeping an eye on him. All we need to be forced out of business is 200 people like John who each send us 20 messages every day. We couldn’t handle it.”

Colin has reason to be paranoid. CyberAngels have received paralyzing email bombs. And someone pretending to be Curtis Sliwa has been sending offensive pictures to Guardian Angels friends and foes. Thankfully, in Colin’s experience, such nastiness is outweighed by the many offers he receives from people extending a helping hand.

How do you become a CyberAngel? The process couldn’t be simpler. Fill out a no-brainer application,

online, of stumbling across pornographic sites, of strangers trying to befriend kids in cyberspace with God knows what in mind. Enter the CyberAngels.

“We realized that there was a problem here,” recalls Colin, who runs the project with, so far, exactly one computer – a PowerBook 150. “People were writing to us as if somehow they expected us to do something. So Curtis and I talked and said, ‘Let’s do it.’ Just like when people phoned us from Moscow and said, ‘Hey, we’ve got a crime problem in this city’ – we went there and laid the foundation for a chapter.”

A year later, the CyberAngels already number more than 1,000, Colin says. Their mission: to do all they legally can to promote online decency and respect, to



Angel or Edsel?
Curtis Sliwa co-founded the CyberAngels to “eliminate sleazoids, freakazoids, and cybersluts.” At least one opponent calls him “the Edsel of thought.”

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nod your agreement to a general mission statement, and you're in. There are no age requirements; you can be 14 years old and become a netcop – and yeah, your 10-year-old sister is welcome to join, too.

The Angels don't ask if a volunteer has been online for any length of time. (Colin has told a few computerless volunteers that he'll be happy to work with them, provided they get themselves equipped first.) No training is offered. "None is needed," Colin insists. "We're not asking them to change very much about their lives. We ask them to keep their eyes open as they go about their daily business online. You don't need any special skills to do that."

Yes, the CyberAngels leader says, he can understand that some online veterans might not be amused at the thought of computer-illiterate children playing police officers. "I would expect a few flames on that issue. People saying, you know, 'What business is it of theirs?' My feeling is you can be a CyberAngel without being an Internet professional. Just as we'll take anybody who wants to run actual street patrols. Listen, everyone has a perfect right to be concerned about child pornography on the Internet, even if they don't have an Internet account, because there are crimes being committed, and they'd like to help. That's perfectly legitimate, if you ask me."

I ask Colin if there are any traits or peculiarities that would disqualify people from joining his force. "So far, I haven't come across anybody that I would turn away," he says. "But if, for example, you wrote to us and said, 'I'm a member of the KKK, I hate foreigners, and I want to look out for them on the Net so we can destroy them together,' then of course, I'd write back and say, 'I don't think you're suitable for our project.'"

"Jaw-dropping hubris"

In email exchanges and online discussion, the group has caught flak from those who see the CyberAngels as a band of clueless Ninja Turtles whose ideas are grandiose, misguided, and kooky. "The Internet is a large, international community," wrote one critic. "Trying to impose standards from the Bible Belt onto folks

in Sweden is a bit of a joke." Attorney Lance Rose, in one of his columns for the electronic magazine *Boardwatch*, castigated the online "safety patrol": "What the CyberAngels are doing would be just wonderful if they weren't also guilty of a jaw-dropping mixture of hubris and naïveté that, in its sum total, makes them at least as great a problem as whatever it is they're out to contain or destroy."

"Look," Colin responds, "our mission is to get things done. If people flood our mailbox saying they've been victimized online and can we please help, we're not going to say, 'Just sit tight while we get the consensus of 40 million Internet users.' We're going to *do* something."

The Angels and their supporters believe online users should show a little appreciation for their crimefighting efforts, if only because their policing may help keep government regulation at bay.

"The Internet is a large, international community," writes one critic. "Trying to impose standards from the Bible Belt onto folks in Sweden is a joke."

Colin knows that "the majority of Web sites do not offer pornographic material. The Net is by no means teeming with child pornographers. It's very much a problem caused by a small minority." Still, he says, that doesn't mean anyone should turn a blind eye. "Suppose there's a serial killer loose in New York City. You can say, that's only one person, what's the problem? Well, it only takes one serial killer for there to be a problem."

This happens often when CyberAngels explain their views. In their metaphors, something bad often becomes something much worse; something legal they happen to dislike becomes tainted with a miasma of unlawfulness. Curtis and Colin believe that people who swap child porn are also predators and child molesters – and the Angels will casually mention them in the same breath as serial killers.

When Colin got into an online discussion about smut with one of his critics, he praised a new European access provider for offering a porn-free environment and

sneered: "You may choose to live in a cyberneighborhood infested with child pornographers and other criminals." Note how the subject of legal adult material, which was at issue, is suddenly equated with (illegal) child porn.

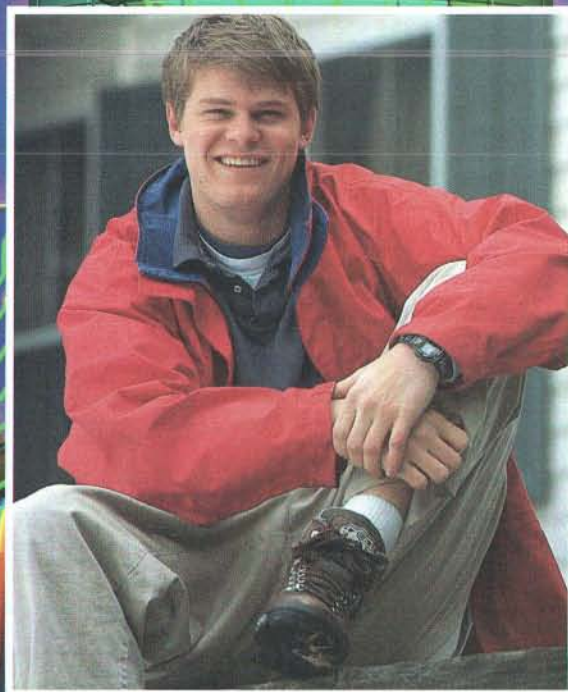
Officially, Guardian Angels will tell you that they only want to ensure that people obey the law. But some of their words and activities are aimed at destroying or banning perfectly lawful material that offends their private sensibilities. Several years ago, in New Hampshire, members of Guardian Angels chapters in Manchester, Boston, and New York, wearing their trademark red berets and carrying placards, loudly protested the opening of an adult bookstore in Portsmouth. More recently, Curtis and five other Angels were arrested for attempting to paint over the artwork of one "Dread Scott," because they considered it antipolice.

Wanted: "pedophiles and radicals"

This tendency to forget what the law allows is not alien to Colin's computer corps, either. He says that several CyberAngels volunteers forwarded him material they found objectionable from gay and lesbian discussion groups. (He repeatedly had to explain to his foot soldiers that there is nothing illegal about discussing gay themes.) And an Australian CyberAngel by the name of Hans von Lieven published a document on the Web in which he excoriates "unsavory characters on the Net, such as political radicals, paedophiles, et cetera." In von Lieven's view, "These people stop at nothing. Usually hiding behind an anonymous or false email address they spread their filth on the Net, hoping it will wind up in as many places as possible." Never mind, apparently, that there's no law against having radical political beliefs.

Racist views, sickening as they may be, are hardly illegal either – at least not in the US. But Sebastian Metz, international coordinator of the Guardian Angels and a

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CyberAngel volunteer, will tell anyone who listens that “pedophiles, racists, and other criminals have approached the computer era with clammy-hand-rubbing glee.” (Racists and *other* criminals?)

Colin is quick to point out that the volunteers’ private sentiments are their own business. The group has no official opinion on anything, except that the laws of the land must be obeyed, and those who violate them must be brought to justice. “There are a lot of things we don’t have policies on,” says Colin. “Bottom line, we’re a single-issue group.”

At least where the Guardian Angels (the parent group) are concerned, that observation hardly withstands scrutiny. The Angels, not content with merely attempting to enforce existing rules, actively campaign for new ones. They do so not just when they dress in colors and try to close down a New Hampshire porn shop, but also when they petition Internet service providers to adopt a speech code.

“The Internet right now is a license to commit crime,” says Curtis Sliwa. “We have every right to look for crime and report it.”

The CyberAngels have taken to what they call “pressurizing” ISPs into mandating such a code, and they’d like to see InterNIC, one of the Net’s few governing bodies, revoke domain names of providers who repeatedly fail to kick off offenders.

For the CyberAngels, none of this has anything to do with notions of free speech or the First Amendment. Information posted on their Web page says “We are all granted our freedom, but not the freedom to hurt, corrupt, abuse, or harass innocent people.” Paul Kneisel, a New York writer who has been following the Guardian Angels for years, begs to differ. Writing in *Cu Digest*, a digital newsletter about computers and civil liberties, Kneisel points out that of the verbs in their list, only “to harass” is defined as a crime in most states. Other than that, he argues, the “freedom of one person involves *exactly* the right to hurt, corrupt, and abuse. In our public parks, we can

have the atheist on his soapbox at one end, and the religious tractarian passing out her ‘Jesus Loves You’ leaflets at the other. Each may feel abused by the other’s actions, but each can (legally) continue.”

Others believe there’s already enough antismut pressure on online services and ISPs. “It’s one thing for AOL or the government to impose speech restrictions,” says David Sobel, a lawyer with the Electronic Privacy Information Center. “That’s bad enough. Do we now have to worry about the moral standards of self-appointed, untrained police officers – people who are not subject to public accountability?”

Polish PC

Some folks know all they need to know about the filth on the Internet. They just pick and choose from Net coverage in the country’s finest publications: the “Cyberporn” cover story in *Time*; the front-page article in the *New York Post* that screamed “COMPUTER SICKOS TARGET YOUR

of the ceiling speakers. Like Colin, Curtis is inseparable from his red beret. The corners of his mouth go up when he cracks a joke – being of Polish heritage, Curtis can get away with the one about the Polish PC – but his eyes never seem to smile. After downing a cocktail of ginseng and maxi energizers (“it flushes the system and provides a great boost”), he’s ready to explain his views about the dangers of modern technology. It boils down to this: “The Internet right now is a license to commit crime without any monitoring. Law enforcement has every right to step in and try to put an end to that, and we have every right, as good citizens, to look for crime and report it.”

But Colin’s line, I say, is that government ought to keep its hands off the Net. Curtis shrugs. “I guess I’m more conservative than most Guardian Angels. The Internet is a free-market economy, and that implies and requires oversight, penalties, a court.”

Don’t conservatives usually ask for *less* government interference? “Sure, but this is an important change we’ve gone through here. You can just bump into porn now, online. You find it without wanting to. It’s like, people have guns in the house, and young kids go exploring, and we ought to protect them.”

I tell him that in almost five years online, I have never accidentally stumbled across pornographic texts or images. “That’s not my experience at all,” Curtis counters. “From the moment the Angels got me an email address, I’ve been flamed and bombed. Some of the email I got consisted of doctored pictures with my head grafted onto some porn star’s body, making it seem as if I was involved in sexual situations of the worst kind. I never asked for that stuff.”

Most online users, however, never experience that kind of vituperation. Doesn’t Curtis think he gets nasty mail because he is in a position of some prominence and attacks something dear to scores of people? “Sure, that’s part of it,” he admits. “But no one is really immune to it. And it’s not just what people *send* you. It could be you’re just clicking around to see what’s out there, and suddenly this filth pops up on your screen. You can’t have public displays of graphic material in the streets of

KIDS.” This is one of the ways Curtis Sliwa stays informed – the 42-year-old commandant of the Guardian Angels and CyberAngels reads the popular press. But unlike most of us, Curtis has never owned a computer, let alone surfed the Net. “I just haven’t gotten around to it yet,” he says of the purchase he keeps postponing. “I’m stubborn. I don’t have a working knowledge of computers. I never use them, but I’m aware of their influence.” Curtis does have an email address, but an assistant at Guardian Angels headquarters sifts through incoming messages and prints out the most relevant ones for Curtis to read. “Meanwhile,” Curtis quips, “I’m relying on my Polish PC.” He points to six plastic crates filled with file folders. They take up quite a bit of space in his modest cubicle at WABC, the radio station that employs him as a talk-show host.

As we chat, the angry voice of Curtis’s station mate Rush Limbaugh crackles out

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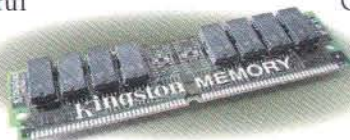
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our cities, and I don't see why that should be any different on the Internet."

He pauses, grinning, gleeful, relishing this thought: "There's irony in the fact that a noncomputer guy like me is responsible for setting up the CyberAngels, when most people told me it couldn't and shouldn't be done."

A few weeks after our talk, Curtis engages in a much more pugnacious exchange – online, no less – with pornographer Al Goldstein, who publishes *Screw* magazine. What was supposed to have been a moderately enlightening debate soon becomes a no-holds-barred slugfest over penis size (Goldstein: "Curtis ... has a cock the size of my thumb") and castration (Sliwa: "The only cure for Al Goldstein's perversions is a visit to the rabbi for removal of his three-piece set"). When the gents get around to discussing smut on the Net, Curtis is more outspoken than ever: "I do not hide behind the flag, the Bill of Rights, and the Constitution in trying to protect the pervers in society." He announces that his "mission in cyberspace" is to "eliminate sleazoids, freakazoids, and cybersluts." Goldstein, not losing an opportunity to get his digs in: "Curtis is the Edsel of thought. The poster child for the brain dead."

Innocent images

So, after more than a year of patrolling and crusading, how many child pornographers have the CyberAngels reported to the FBI?

"Zero," Colin says without blinking. "Because we go through the ISPs. For example, we reported a lot of America Online members who were trading in child porn to AOL's Terms of Service. A couple of months later the FBI did their big bust" – in last September's Operation Innocent Images, the bureau raided 127 homes and businesses and made 12 arrests. "I bet we played our part in that."

Asked if CyberAngels spurred Operation Innocent Images, Peter Toren, a trial attorney with the Computer Crimes Unit at the Department of Justice, declines to comment on "an ongoing investigation." Later, he mentions casually that he wasn't even aware of the group's existence.

Howard Jonas, president of IDT, one

of the northeast's largest ISPs, says he's never been contacted by the CyberAngels. If he had, he's not sure he would have pulled out all the stops to help them.

"Let's say there's objectionable – or even illegal – material being piped through IDT computers," Jonas, the father of six children, postulates. "What's the proof that the person whose name is on the message is the real poster? It could be some hacker trying to pull off a joke at someone else's expense. Besides, child porn doesn't *originate* on the Net. Those pictures are scanned from illicit magazines. That doesn't make it legal to trade in the stuff, but the actual harm happens not so much on the Net as it does wherever and whenever those photos are taken. The manufacturers of that type of smut are the *real* perpetrators, and it seems more important to nab *them*."

Of course, Jonas says, if law enforcement asked IDT to cooperate in an investigation, the company would – in

"Child porn doesn't originate on the Net,"

says Howard Jonas. "The actual harm happens wherever and whenever those photos are taken."

a heartbeat. "But I'm not going to bend over backward to accommodate some freelance posse, whose time might be better spent volunteering at a local school or visiting kids in a hospital."

The CyberAngels may very well be welcome there, but law enforcement will not necessarily give them the warmest of receptions. "I don't feel it is appropriate for them to cross the line into investigating child pornography," says Douglas Rehman, a special agent with the Florida Department of Law Enforcement who frequently goes online looking for law-breakers. "If the CyberAngels solicit child porn, they commit a crime. If they possess it, they commit a crime. Legitimate law enforcement then winds up wasting time investigating *them*." The Justice Department's Peter Toren expresses surprise that the CyberAngels profess to have knowledge of countless online felonies. "If that is so," he says, "we would certainly

expect them to share that knowledge with legitimate law enforcement, so we can take it from there." (At press time, the Angels claimed to have finally reported certain suspicious activities to the FBI.)

Could the CyberAngels become a cherished ally of law enforcement if they somehow steered clear of soliciting and possessing child porn? Not exactly. The amateur crimefighters may blunder into an investigation that's already under way. "Suppose we're monitoring someone whom we suspect of trading child porn online," posits Rehman. "If the Angels report that same person to the ISP, and the ISP boots the guy off the system, we may not yet have gathered enough evidence to justify a prosecution. The Angels will have blown the best chance we had to put away a known criminal."

But surely, police officers have no objections to alert citizens keeping an eye on the 'hood? "A *legitimate* Neighborhood Watch uses a passive scenario," Rehman

says. "They see suspicious activity, they call us. They don't go out and buy crack and take it to the nearest precinct. They'd be breaking the law. And the CyberAngels are breaking the law the moment they knowingly download illicit pictures."

Paul Kneisel raises the same issue in his *Cu Digest* article, questioning the logic behind the Angels' "engaging in their behavior to fight the very behavior in which they engage." And another thing, Kneisel says: What's to stop kiddie porn collectors from signing up with the CyberAngels, so that when the police come knocking, these perps can claim a degree of innocence?

Colin scoffs at that notion, saying he's not aware of "some kind of immunity from the law" that the Angels might have.

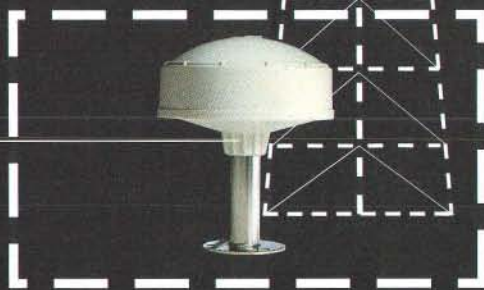
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Rogier van Bakel (rogier@li.com) is a contributing editor at Wired.

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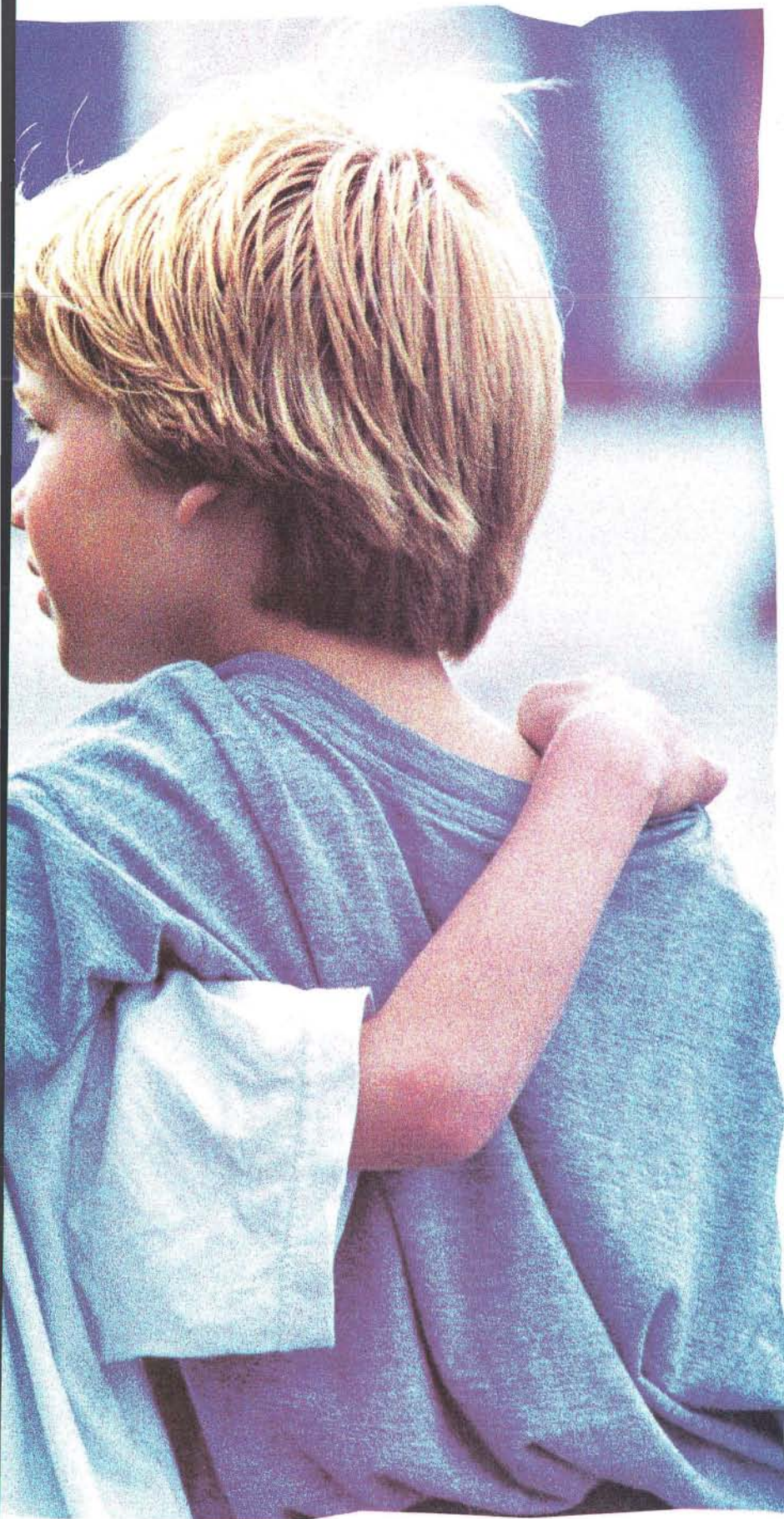


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SAUZA "CONMEMORATIVO." THE SMOOTHER, OAK-AGED TEQUILA.



Daily Planet

By Mike Godwin

Near the end of Howard Kurtz's new book, *Hot Air: All Talk, All the Time*, I found the clue to the *Washington Post* media critic's reflexive dislike of the Net: he thinks it's all a big talk show. Like many traditional journalists, Kurtz supports freedom of the press in theory, but in practice he finds it appalling – he's not ready for a world in which everyone gets to be Clark Kent or Lois Lane.

Kurtz is not wholly off base when he implies that the character of some discourse on the Net is like that on *Ricki Lake*, where confessional goofiness, wild rumor, and personal attacks are normal. But Kurtz and his confreres use the most frivolous talk on the Net as an excuse to dismiss its value as a source of journalism.

That same attitude reared its head when veteran journalists like former TV correspondent Sander Vanocur and newspaperman Bill Kovach participated this March in a "new media" panel at the sixth Computers, Freedom, and Privacy conference in Cambridge, Massachusetts. Both insisted you need good editors (read: an established news organization) to do good journalism. And Vanocur opined how the Net may be little more than

"a Tower of Babel," where people use their computers as megaphones to send their personal gripes around the globe. "I hear America kvetching," Vanocur said, paraphrasing Whitman.

Ironically, I'd paraphrased the same line myself just weeks earlier in an Op-Ed for the *San Francisco Chronicle*: "I hear America typing. And, sure, not everything they say is well-thought-out, or even well-intended, but suddenly there are a lot more voices out there being heard, and a lot more people listening." My point was that the Net ends the monopolies the power elite have long held in defining public debate. That same leveling is occurring in the playing fields of journalism, thanks to the Net, and Kurtz & Company's glib dismissiveness may reflect their own discomfort at that fact.

What's happening, despite the dismissals of Kurtz and Vanocur, is neither a Tower of Babel (since real stories such as *Time* magazine's "Cyberporn" scandal have already been broken on the Net) nor a talk show (since there's no cynical producer tweaking our postings for outrageousness so they'll earn higher ratings). Instead, everyday Americans are starting down a trail blazed by traditional journalism.

Consider: the harshest talk we see on the Net now is scarcely more inflammatory than that produced by American printers and publishers at the founding of the United States. The "tradition" of "objective" journalism, while utterly worthwhile, is a relatively new invention. So it's no wonder Net users have got some catching up to do before they match the standards of *The New York Times*. But the thing to remember is, *they will catch up*. And the line between professional journalists and the rest of us will be

blurred, perhaps even erased.

Kurtz's dismissiveness isn't limited to his book – it also emerged in two stories involving the Net. In both instances Kurtz wrote a column criticizing Net culture for treating reporters harshly, even though the

When US Attorney General Janet Reno announced recently that the FBI had used the "first Internet wiretap" to catch a 22-year-old Argentinean hacker, it was one more step in the government's march toward deconstruction of personal privacy.

The FBI used a modified "sniffer" program, a tool that monitors network traffic, to watch

for the hacker's digital footprints. But the program also sucked in two unrelated messages due to coincidental similarities. Result: slam dunk invasion of privacy.

It can be argued that having a computer monitor communications is preferable to having a human do it. Computers can be made to forget. The troubling aspect, points out David Banisar of the Electronic Privacy Information Center, is that computers can be tweaked to capture any kind of data at relentless speeds. The fact that the FBI's foray into computer-assisted wiretapping failed on its first outing should be enough to set off alarm signals.

Brock N. Meeks (brock@wired.com) is Wired's Washington correspondent.

Internet Wiretaps

By Brock N. Meeks

On the Internet, no one knows what time it is. Say you want to schedule a RealAudio interview on the Web. How do you announce the time when your audience is global? Do you post the broadcast hour in your local time, which if you were Australian might be

2 p.m., and then let everyone else figure

Dynamic Time

By Kevin Kelly

out what that means to them? Or do you post it in Greenwich Mean Time, which is equally awkward?

The correct answer: We should invent a little protocol for dynamic time. Someone else's specific time inserted into a "dynamic time slot" on a Web page will always be translated by your computer into local time. So if you see a posting that advertises an appearance by O. J. Simpson in Japan that starts at 3 a.m. your time, there's no confusion about when – only why.

Kevin Kelly (kevin@wired.com) is executive editor of Wired.

"Technology is the campfire around which we tell our stories." – Laurie Anderson

"A good scientist is a person with original ideas. A good engineer is a person who makes a design that works with as few original ideas as possible." – Freeman Dyson

Net's criticism of the reporters was wholly justified. A 1994 Kurtz column involved a *Los Angeles Times* article that conflated hackers, pornography, spies, and cryptography into a single, incoherent, inflammatory story, while a 1995 column addressed the hubbub surrounding *Time's* "Cyberporn" cover story featuring a fraudulent "study" of online porn from an undergraduate hustler at Carnegie Mellon University.

Did Kurtz's columns criticize the reporters who wrote those stories or the editors who chose to run them? Did Kurtz praise the amateur reporters on the Net who dug up the truth behind a story whose sources had snookered *Time*? No. Instead, he criticized Net users for being uncivil and unkind to journalists who had royally screwed up. In Kurtz's world, it seems, it's Us versus Them, where traditional journalists are Us, and those Nethead and talk-show yahoos are Them.

Increasingly, though, there won't be any Us versus Them – we'll all be playing the role of journalist. The stories our grandparents shared over the back fence are now things we share with each other online. The result? The fiction that "news" is different from "gossip" will be harder to maintain – which means, perhaps, that we should upgrade our opinion of gossip. After all, we don't really read press accounts of the crash of a 7-year-old pilot or the search of Ted Kaczynski's one-room shack because we think it's "news you can use" (it isn't). We do so because we're social creatures – we're wired to be curious about what other humans are up to.

The Net ensures that "news judgment" decisions are no longer made solely by the pros, like Kurtz or Vanocur, who think they know what's best for us. Those decisions are in our hands now. So the task is no longer to find the newspaper editor we can trust – we must become that editor ourselves.

Mike Godwin (mnemonic@eff.org) is staff counsel for the Electronic Frontier Foundation and lives in Berkeley, California.

Art Versus Capitalism

Continuous product innovation might be good for capitalism, but it's bad for art. With a constantly shape-shifting tool set, there's too much emphasis on the tool and not on what it can do. Instead of focusing on new ways to tell stories, netizens drop their projects and scurry to download the newest software.

So if you find yourself asking where the Orson Welles of the Web is, remember that when the groundbreaking *Citizen Kane* was released in 1941, artists had already

amassed
more
than 40
years

of creative intelligence. Who knows how long it'll be before the Web reaches a steady state – if it ever does.

After all, perhaps the whole point of the Web is that it destroys the myth of the individual genius artist. The network's the thing, not the individual, right?

Spencer E. Ante (spencer_ante@pcworld.com) is an editor of the annex (www.pcworld.com/annex/).

Ghosts in the Machine

By Katie Hafner

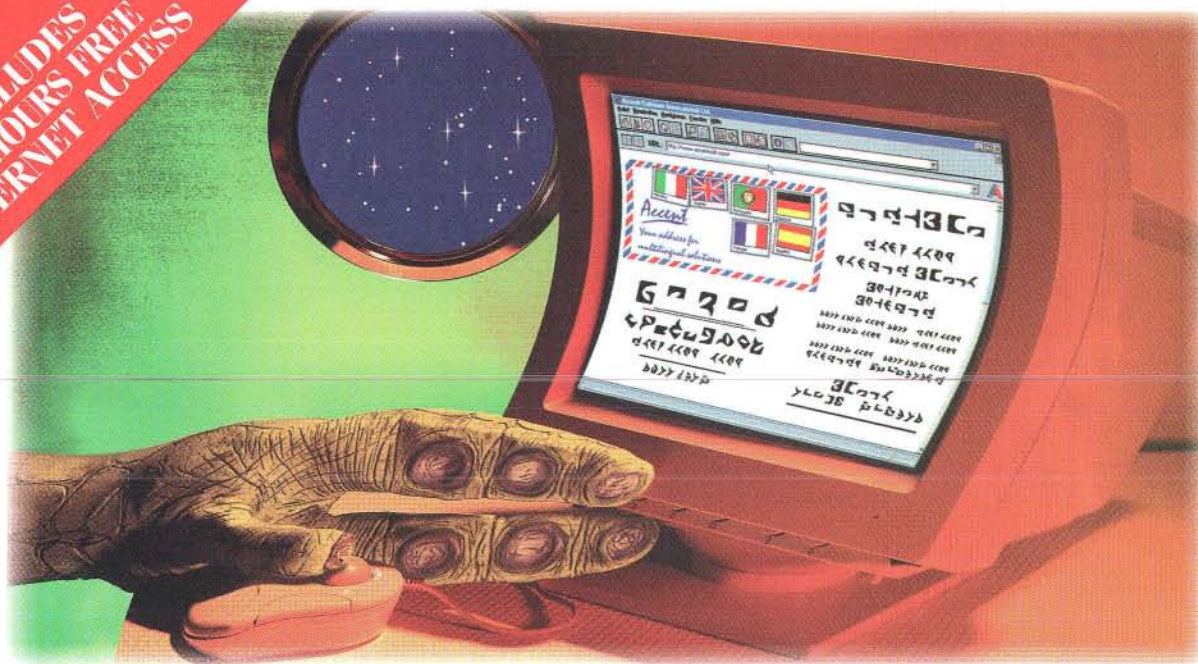
The Net of the 1970s and 1980s – a cozy place for elite computer scientists to schmooze, carry on, and carry out their research – has long since been supplanted by something at once more sophisticated and more unwieldy. Yet in dozens of ways, today's Net still reflects the personalities and proclivities of those who built it.

The creators of the original Net, which traces its roots back more than 25 years, weren't just scientists. They were inventors. To make wide-scale computer networking possible, they invented packet switching. Once the concept of packet switching was in place, they came up with an algorithm to perform dynamic routing, and they figured out a way to deal with congestion on the network.

In the field of communication theory in the 1960s, this was pretty daring stuff. Back then, the notion of digitizing a message, breaking it into discrete packets, sending them every which way through a network, then reassembling the information at the other end was revolutionary. AT&T executives, too entrenched in the traditional methods of telephony to tolerate new ideas, were convinced packet

"Television is a medium, so called because it is neither rare nor well done."
– Ernie Kovacs


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"Two-dimensional pages will become the graffiti of three-dimensional space."
— Tim Berners-Lee

I'm convinced a new kind of social responsibility is emerging — an imperative to be succinct. Just as we've had to curtail our gaseous emissions in an increasingly smoggy world, the information glut demands that we be more economical about what we say, write, and post online. With time an ever more valuable commodity, the long-winded are beginning to resemble people who open their car door at a stoplight to dump trash onto the street.

We now have the means to publish virtually anything we wish. If we don't respect our new information ecology,

we will increasingly suffer from

A New Brevity

By David Shenk

data anarchy and social dissolution. Technically, we'll have access to a phenomenal vat of information, but in practical terms, we'll become so specialized and distracted that we'll share less and less with our fellow citizens. Give a hoot, don't info-pollute.

David Shenk (dshenk@aol.com) is writing a short book about the information glut for HarperCollins.

switching wouldn't work. And IBM believed no computer existed that was small enough (read: cheap enough) to be used as a network switch. But the Net pioneers, young men with strong opinions and nothing to lose, paid no attention and built their network anyway.

So it's not surprising that the Net of today remains imbued with the personality quirks of its inventors. Frank Heart, the BBN engineer in charge of the team that built the interface message processor, the progenitor of today's network routers, was a pragmatist through and through. And that attitude toward technical invention — build it, throw it out on the Net, and fix it if it breaks — has permeated Net sensibility ever since. Pragmatism also prevailed in the network's topology. For years, the Net's resident topologist, Howard Frank, was someone with a lot of experience in mapping out natural gas pipelines. A computer network, he figured, shouldn't be so different. And he was right.

Then there was the cabal of graduate students at UCLA, where the first IMP was installed in 1969. In 1968, Steve Crocker, a UCLA grad student of extraordinary courteousness, started a series of notes for the Network Working Group. Crocker named the first note "Request for Comments" because he wasn't sure who was really in charge of Net protocols (he sure as hell knew it wasn't him) and didn't want to offend anyone by sounding too official. Now we're on RFC 1936, and RFCs have become the Net's de facto bylaws.

The Net grew by building on existing technology. Bob Metcalfe got his ideas for Ethernet in 1972 while spending the night on Steve Crocker's sofa. Looking for a little bedtime reading, he picked up a paper on Alohanet, an experiment in Hawaii that became the technical underpinnings for Ethernet. Bob Kahn, one of the original IMP guys at BBN, went on in 1973 to co-invent TCP/IP, the suite of protocols that grew from the original host protocol. Kahn relentlessly championed openness in the process of protocol design, and it's that very openness that helped the Internet and TCP/IP prevail over other networking technologies simply by making itself available to anyone who wanted to implement it. The shock of commercialization notwithstanding, openness and ad-hocracy live on in the Net of the '90s.

Vint Cerf, who followed his best friend Steve Crocker to UCLA for graduate school, is now the éminence grise of the Net. It was Cerf who gave the Net its civility. More than anyone, he cajoled and argued and humored the rest of the world into adopting TCP/IP, which he and Bob Kahn had sketched out during an all-nighter at the Cabana Hyatt in Palo Alto.

Few of the Net's creators have gotten really rich off their invention, and they probably never will. They're like the pioneers in tennis, who popularized the game while playing for pocket change — and paved the way for a new generation to make millions. But in computer networking, no one gets too old to keep playing. It's the creators of the Net, now in their late 50s, who still run the Internet Society, and they still go to meetings of the Internet Engineering Task Force. When the Kahns and Cerfs and Crockers finally retire, the Net will miss them. It has done well by them.

Katie Hafner (katieh@zilker.net) is the co-author of Where Wizards Stay up Late: The Origins of the Internet, to be published by Simon & Schuster in August.

It's great that AT&T and MCI are competing to get Internet access into more homes. The next step: make a Web site an automatic free feature of a phone account. If your number is (510) 555 0552, then your Web address would be www.phoneco.com/510555

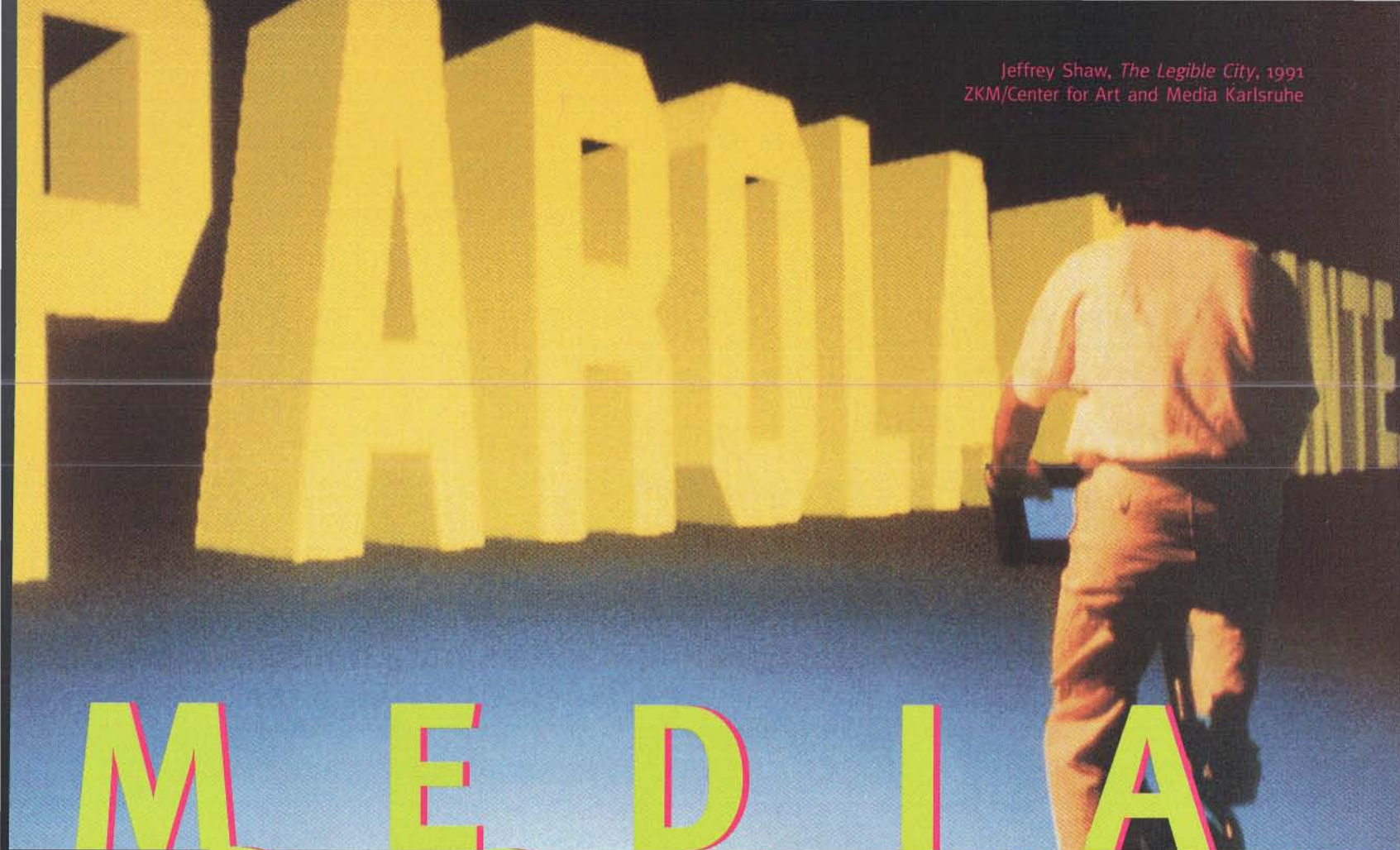
Phone Home

By Dave Winer

0552/. Use ftp to move stuff in. Your password is your voicemail password. It's an easy feature to add.

Dave Winer (dwiner@well.com) is an online columnist and software developer.

"Anyone who thinks science fiction is about the future is being naive. Science fiction doesn't predict the future; it determines it, colonizes it, preprograms it in the image of the present."
— William Gibson



Jeffrey Shaw, *The Legible City*, 1991
ZKM/Center for Art and Media Karlsruhe

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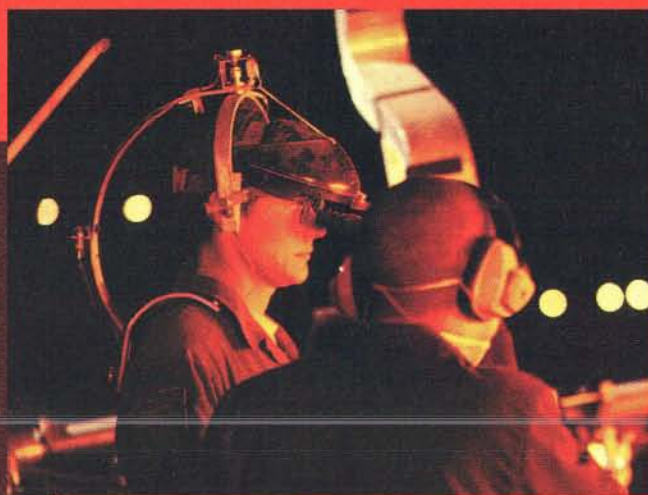
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downtown

IS PHOENIX BURNING?



Air Launcher, Running Machine, and the V-1 (from left, above) unleash a mechanical fury. At left, SRL crew members Dezso Molnar and Flynn Mauthe.

Bobby 808 (wearing head remote) and Ralph Burgert maneuver the Air Launcher. Below, Christian Ritsow and his beastly creation, the Drunken Master.



BRUCE STERLING

THE PERILS OF MARK PAULINE - ON THE ROAD WITH SRL'S THEATER OF MECHANICAL CRUELTY.

I'm in Phoenix, Arizona – not for the Superbowl, like the 100,000 other people who flew in this weekend, but I've got my reasons – and I'm pag-

Culprits in Rock Barrage Elude Chandler Police Surveillance

Rocks and chunks of concrete larger than softballs have been raining on a Chandler neighborhood, pounding roofs and smashing into cars. Police have posted surveillance and have increased patrols, but the rain of rocks continues. Neighborhood Block Watches have been able to do nothing more than collect the rocks – as many as 30 after an attack Tuesday night. Residents believe some device is being used to hurl the missiles.

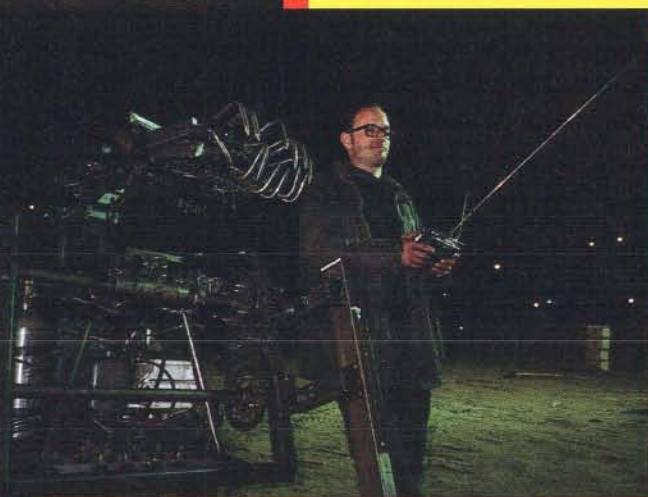
But here's the coverage I'm looking for, on page D7:

Rampaging Robots Ready to Wreak Havoc Downtown

Some 30 tons of crashing, fire-spitting robotic machinery will perform at 11 PM Saturday at the Icehouse, 429 West Jackson Street, Phoenix. Survival Research

ing through the latest issue of *The Arizona Republic*. The paper's a lot like the community it serves: glossy, nuttily conservative, and oddly punch-drunk.

Friday, January 26, 1996, an article on page B2:



Laboratories (SRL) of San Francisco will present its "Million Inconsiderate Experiments," with machine art tromping, stomping and shooting flames. The show, under the direction of artist Mark Pauline, has toured Europe and has been performed in Los Angeles, New York, and Seattle.

I'm pretty sure I can solve this mystery in Chandler, if the authorities are interested. Put out an APB for a scruffy male adolescent, a bright kid who sits at the family table sullenly radiating poltergeist vibrations and bending fork tines with his molars. He has a deep, secret interest in junkyards, whence he found those hinges, bolts, one-by-twelves, bungee cords, and powerful springs. Look for this kid, and while you're at it, look for his prankster friends.

In the meantime, SRL capo Mark Pauline, the 42-year-old adult upgrade of a deeply alienated teenage techie, stands in an abandoned Phoenix railway yard. I watch as Pauline checks a soldered connection, taps at a pressure gauge, steps back, confers with an associate in a set of coveralls even filthier and more tattered than his own, then presses a handheld switch.

A couple feet away, one of the few V-1 jet engines in private ownership comes to sudden life. FWOOOOOOM! A dragon tongue of misappropriated Nazi vengeance licks the desert sky. A pause, a few words of consultation, Mark couldn't be more blasé.

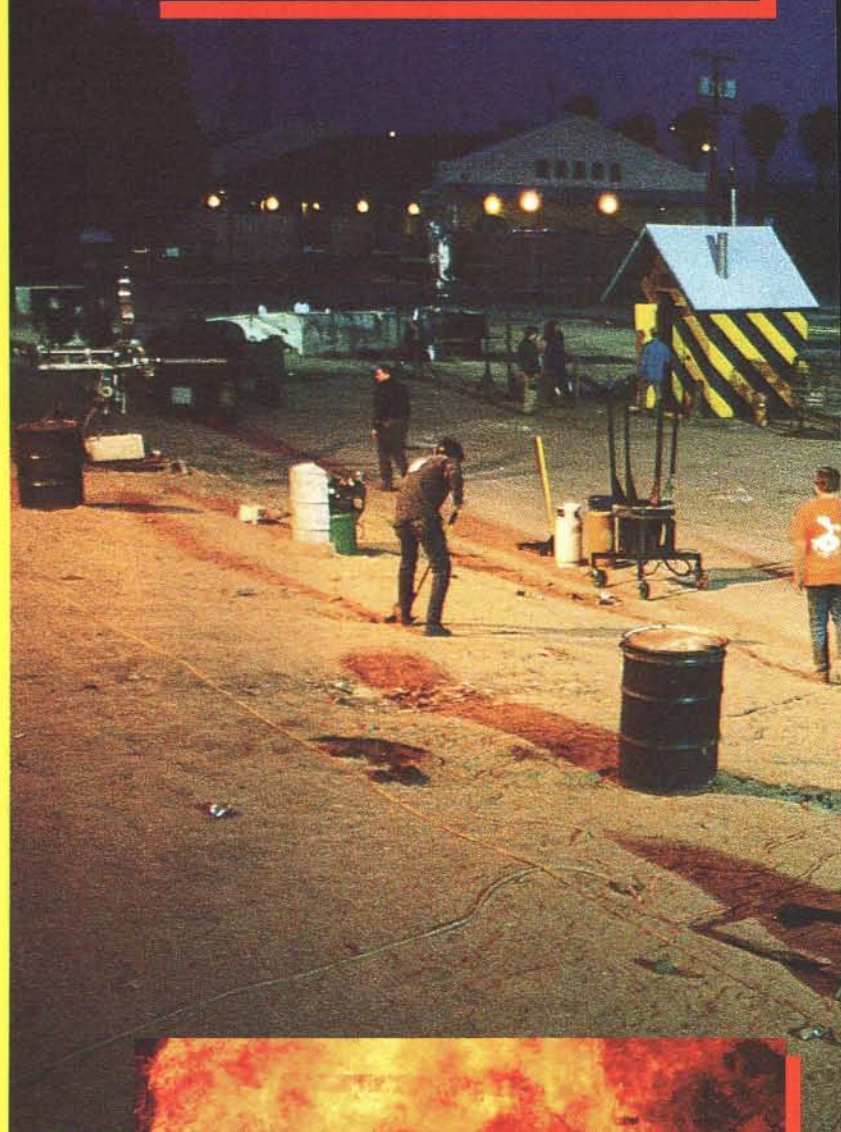
FWOOOM!!! BLADDABLODDA-BLADDABLODDA – KA-BLAM! Waves of heat kick up spinning torrents of yellow dust. Half-

combusted fuel explodes deep within the iron throat of the jet, producing a fiery belch that is not merely loud but insanely loud, industrial-accident loud. The temperature in the freight yard, somewhere in the low 40s, soars at once to a toasty 90 degrees.

The SRL crew reacts with polite interest. Polite interest is the mental default-register of SRL roadies. Nearly 50 of these wonderfully odd people are roaming with purposeful step in and out of a forlorn warehouse, going about their individual businesses in their distributive, nonhierarchical, swarming fire-ant fashion. They're adjusting fan belts, greasing drive chains, topping fuel tanks, and clamping pneumatic hoses.

Mark's jet vomits another massive gush of pyrotechnic hell. The crew looks up at the skull-splitting racket with limpid smiles of unfeigned appreciation. Watching Mark work his rocket is clearly giving them some deep arts-and-craftsy frisson. It's as if they're watching Gustav Stickley assemble a classic hardwood settee. Four lads and lasses are skewering plaster corpses onto iron spears for the giant SRL catapult. They stop their work to cover their ears. KABABLOOM! WHOMP! BLUDDA BLUDDA BLUDDA BLAM! The jet begins to glow a cheerful cherry red around the seams.

Mark maneuvers the V-1 on its self-propelled, radio-controlled platform. Many of SRL's engines of destruction are self-propelled, on legs, or wheels, or tracks, or foul-looking helical screws. Then there are the emplacements, such as the Flamethrower; the



Drunken Master lurches at Screw Machine (top), while the House explodes in a fiery demise (right).

Grotesque billboards adorn the backdrop of SRL's stage in Phoenix (below); crew members weld, glue, saw, and clamp in preparation for the midnight show.

giant tooth-and-tailed wooden Ark; and the Air Launcher, a laser-sighted monster gas gun that fires concrete-filled root beer cans.

An impromptu convention of 20 Phoenix police officers has assembled outside the chain-link. They've swarmed up from all directions, on bicycles and in prowler cars, in full expectation of some kind of mortar attack. Phoenix's finest watch the goings-on with jaws agape.



Plaster corpses, skewered onto iron spears (above right), await their turn at the giant catapult, from which they'll be flung into SRL's pyrotechnic hell.

Machines on thick metal legs with big jangling teeth. Giant hideous billboards of rubber-necked starving children with eyeballs like hot black marbles. It's a bunch of weird dirty hippies, and they've got a jet engine!

An SRL crew member ambles over to meet the cops. He mentions the time SRL appeared on network television. With this

Bruce Sterling (bruces@well.com), a regular Wired contributor, is author of *Mirrorshades*, the definitive document of the cyberpunk movement, and *The Hacker Crackdown: Law and Disorder on the Electronic Frontier*.

casual revelation, the attitude of the cops changes at once, and permanently. Television, huh? TV coverage absolves absolutely



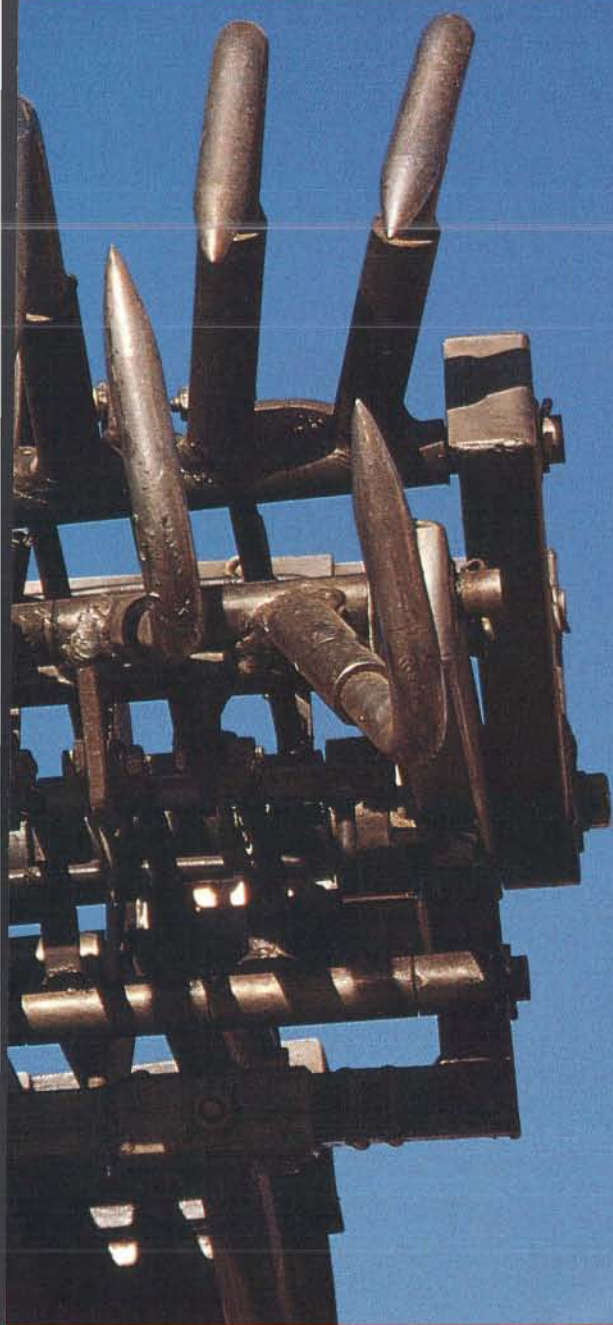
Mike Fogarty, SRL's electronics repair guy, does some last-minute tinkering before the performance.

anything in America. If these guys have been on 20/20, then they must know what they're doing, right? They're not insane, they're *artists*. Artists? Not a problem! These cops have Superbowl crowds to worry about. Besides, five nuts with a rocket might be arrested. A small army of 50 nuts methodically deploying 30 tons of rampaging machinery are a problem of a scale for the National Guard. Better just to let them be. What's the harm anyway? Nobody cares what happens in *this* neighborhood.

The area around us, Jackson Street in downtown Phoenix, defines industrial decline. Mechanical performance artist, producer, and local entrepreneur David Therrien, the man who brought SRL to Arizona, has

Majordomo Mike Dingle crashes amid the Flame Balls, which are filled with pressurized carbon dioxide and gasoline and used as flamethrowers.





The Drunken Master's "claw" with a tooth out of whack.

Mangled from battle, Chip Flynn's Triangle Machine uses hydraulics to hop nimbly from side to side, bobbing and snapping its steel jaw at its victims.



a Jackson Street performance space he calls the Icehouse. The club was an icehouse once, built to store, among other things, frozen beef carcasses for the railroad. Today, it's an almost windowless three-story bunker with scary, hermetically sealed refrigerator doors.

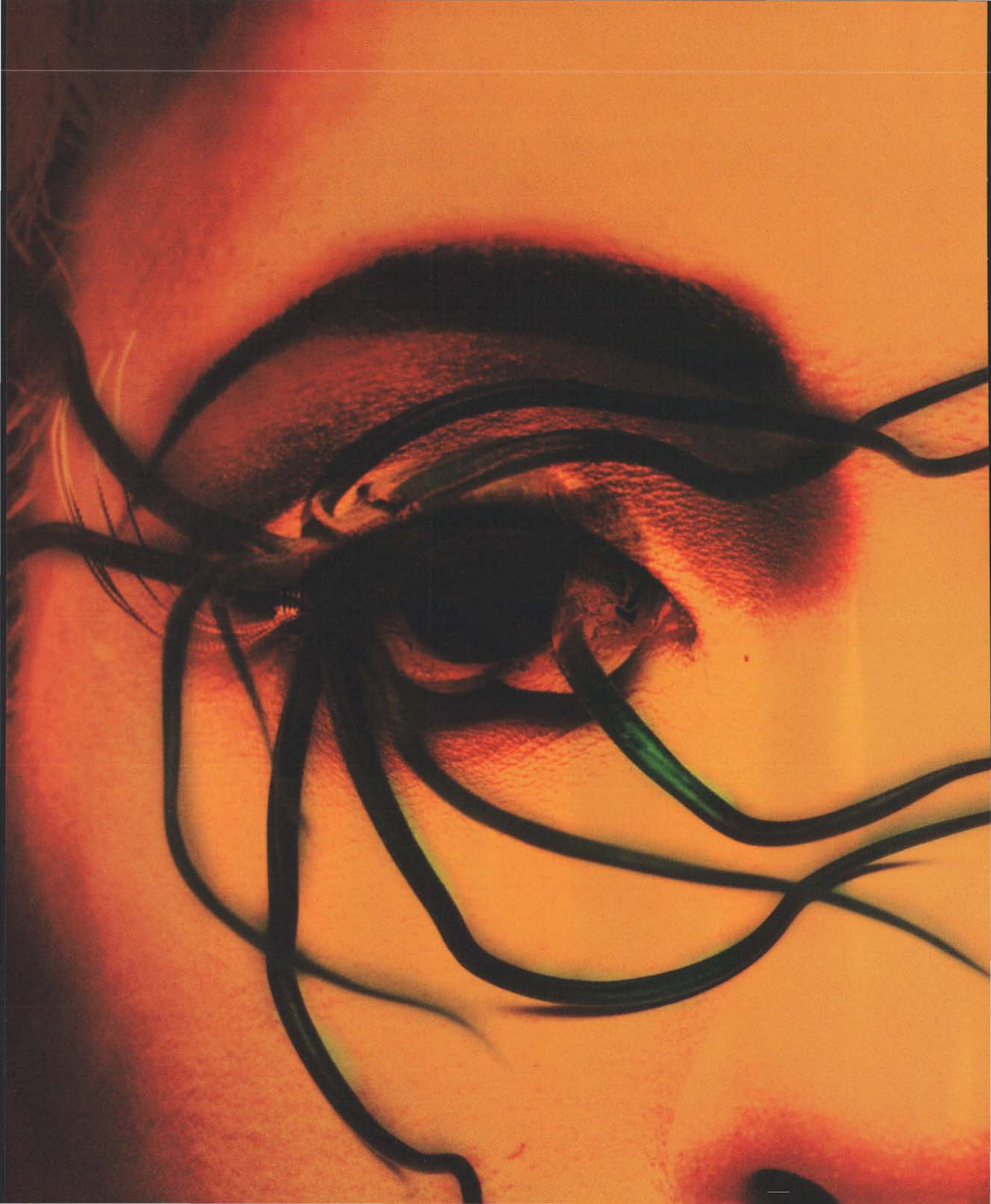
Therrien also leased the derelict warehouse next door. It holds several tons of SRL's buzzing, whining, and sparking heavy machinery, trucked in from San Francisco by bus and flatbed. The old warehouse

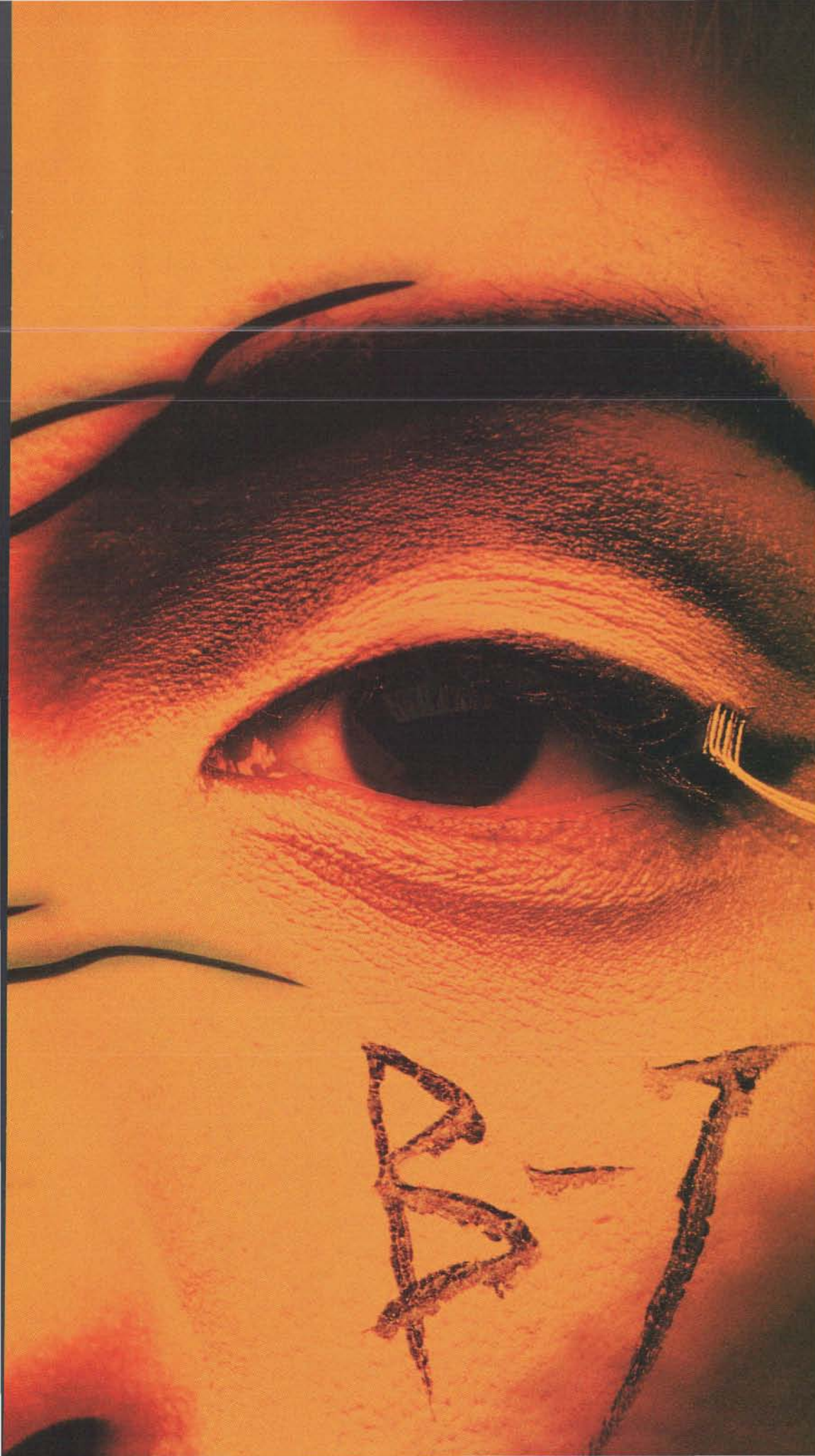
might make a fine set of artists studios someday, Therrien tells me optimistically. Therrien has a goatee, wire-rims, a radio head-set, and a visionary eye. He's a living exemplar of the urban principle that real estate of absolutely negative value can always be given to artists. Let Art play the phoenix here. Artists are dying for studios, and they'll do anything to be left alone by the authorities. There's nothing wrong with this shattered, pockmarked, ruinous property that electricity, insulation, telephones, cleaning, heating, cooling, painting, furnishing, and rudimentary sanitation can't cure.

The SRL crew members work inside the warehouse, pretty much around the clock. When they do sleep, it's in yet another Therrien potential property, an abandoned, broken-glass, utterly forgotten industrial cavern humorously known to SRL as "Hyster Heights, A Planned Community." Getting the querulous city authorities to approve the resurrection of this building may be tougher, since the Hyster machine shop still reeks of '50s-era environmental contaminants. The alleged health risk hasn't stopped the local vagrants from starting a swarming tent-and-grocery-cart encampment nearby, right under the ceaseless traffic noise of the local overpass. Throw in the high-constant earsplitting racket of the Phoenix Sky Harbor flight path, and the Pauline aesthetic makes perfect sense here.

Mark Pauline has a good line of gab, in his elliptical, left-handed fashion. He's at relative rhetorical ease with classy theoretic-

154 ►





Diva

Using a traditional 4-by-5 camera, Yukinori Tokoro elaborates on his high-res technodivas with a Power Mac 9500/132 and 512 megs of RAM. His recently published limited edition CD-ROM, *The Inhabitants in the Fantasy World*, features more than 150 works from his books *Yukinori Tokoro* and *Diva*. For a closer look at this young artist's work and life, check out www.ajbb.co.jp/tokoro/tokoro.html. — John S. Couch

John S. Couch is foreign editions coordinator at Wired.

The man at the next table in Coco's Bakery Restaurant has a whole bunch of friendly advice. "You should understand," he says, "the Softies ain't gonna tell you shit. They're loyal to Father Bill. They got an investment that isn't just financial, it's spiritual. It's a *shared vision* thing."

This ragged character smelling of coffee and Camels calls himself Jake, has a sandy mustache and ponytail, wears a red-checked shirt and a baseball cap, and looks like a construction worker. He claims, though, that he used to be a C++ programmer at Microsoft and now has his own start-up company developing ultrathin keyboards for laptops. For all I know this may be true. You can't judge anyone by appearances here in the sprawling minimall mosaic just south of Redmond's industrial parks. A woman sitting behind me is complaining to her friend about software upgrade policies. Two kids waiting to pay at the register are arguing about lossy data compression. Everyone seems touched by nerd fever.

They Render Bill unto

www.wired.com/4.07/microsoft3d/

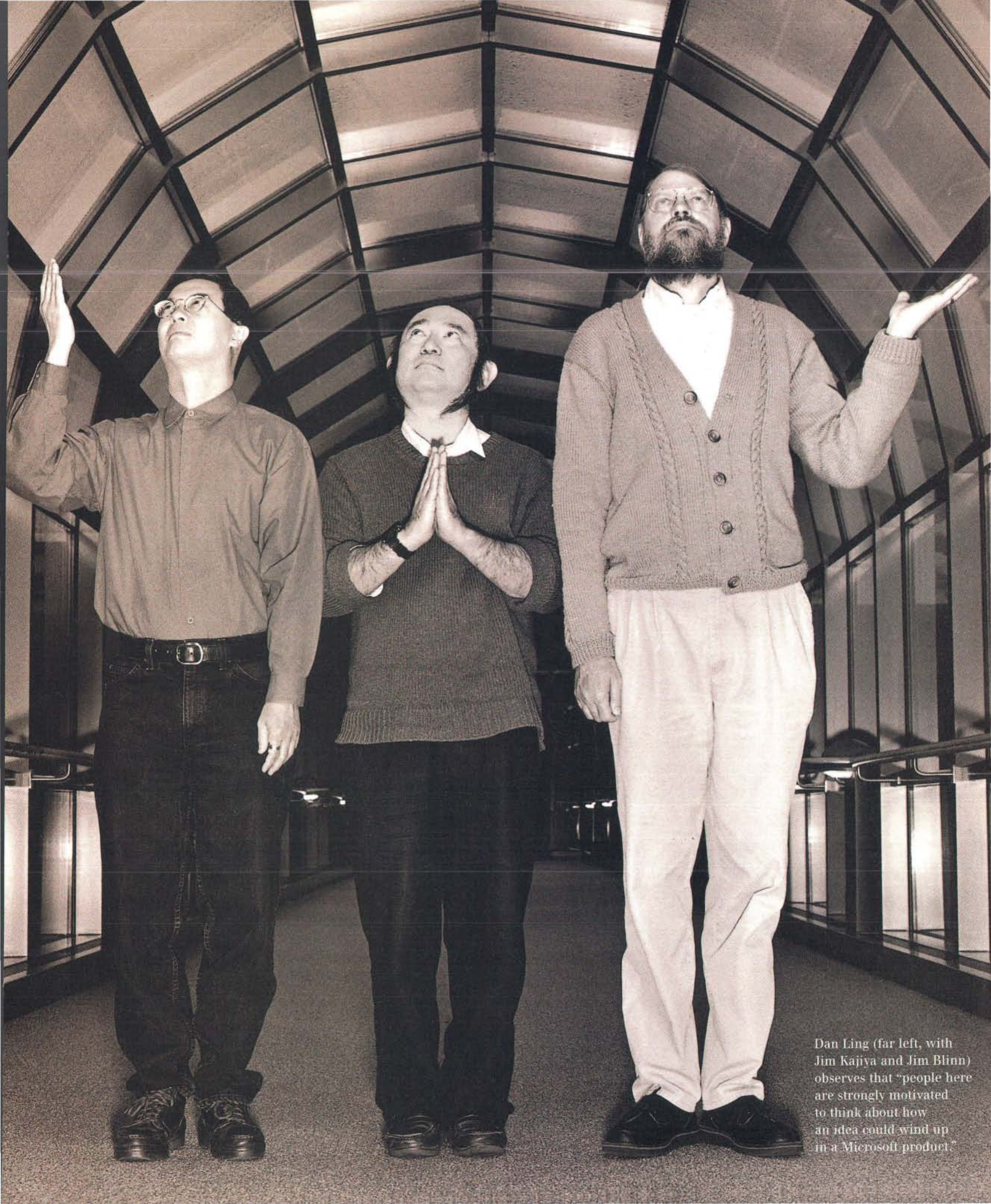
How Microsoft plucked the world's most renowned 3-D graphics pioneers to shape the future of all things visual. **By Charles Platt** Photos by Karen Moskowitz

Microsoft is the catalyst, of course. Jake calls its employees "Softies," he says, because they're like Moonies or Trekkies, sharing a blissed-out, cult mentality. "And Gates, I call him Father Bill because he's the high priest leading the faithful."

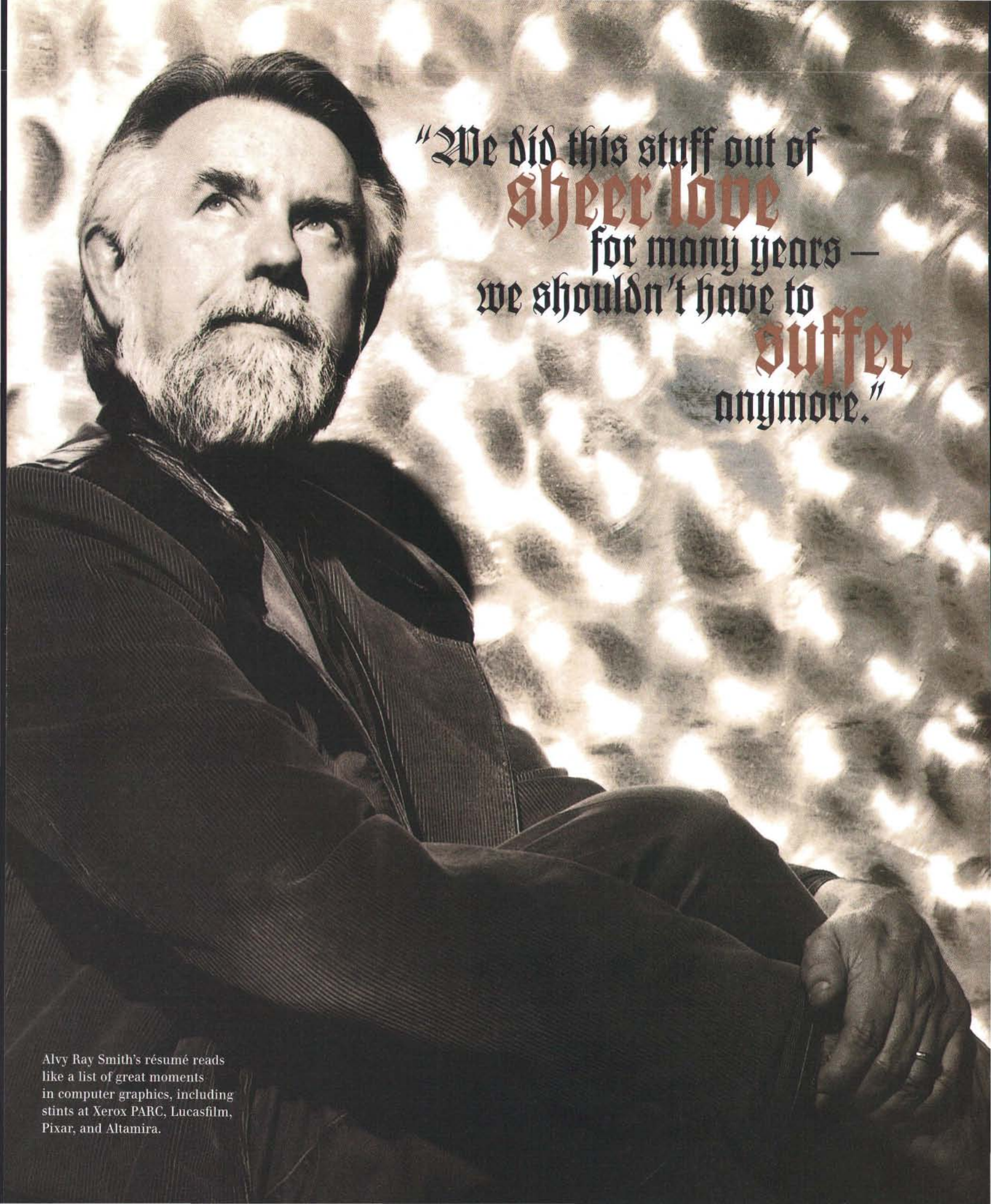
This isn't the image we're accustomed to. Writers usually depict Microsoft as a cruel sweatshop riddled with angst. In his recent book *I Sing the Body Electronic: A Year with Microsoft on the Multimedia Frontier*, Fred Moody refers to the "excruciating psychological pressure," which can "reduce people to rubble."

On the other hand, after a whole year studying the Softies, Moody also admits, "I left the company's campus more confused than I was when I entered."

And this is the problem. Most journalists aren't equipped to share the Softie headspace. They haven't experienced the compulsive pleasure of hacking code, so they find it impossible to believe that someone could actually *like* working on C++ algo-



Dan Ling (far left, with Jim Kajiya and Jim Blinn) observes that "people here are strongly motivated to think about how an idea could wind up in a Microsoft product."



"We did this stuff out of
sheer love
for many years —
we shouldn't have to
suffer
anymore."

Alvy Ray Smith's résumé reads like a list of great moments in computer graphics, including stints at Xerox PARC, Lucasfilm, Pixar, and Altamira.

rhythms twelve hours a day, seven days a week, under severe competitive pressure. As a result, they end up sounding like adults tut-tutting over kids playing videogames. "Why don't you go play baseball, dear? I really don't think it can be good for you, staring into a screen like that."

Well, maybe not; but the Micronerds I've met wouldn't have it any other way. As Jake says, they have a cultish quality. They sound ecstatic when they describe the intellectual stimulation at Microsoft, the lack of a dress code, the basketball court, the football field, the cheap cafeterias, the free beverages, and (of course) the stock options.

This presents me with a problem. There are things I have come here to find out – but the loyal disciples of Father Bill are a race apart, and they're certainly not going to jeopardize their state of grace by blabbing secrets their mentor wouldn't wish them to reveal.

Here's the background: Three years ago, Microsoft's research division went into a quiet little hiring frenzy, quickly growing from around 10 employees to more than 100. Among the newcomers were 11 experts in 3-D graphics, including world-famous pioneers such as Alvy Ray Smith, who co-founded Pixar, and Jim Blinn, who produced the first 3-D simulations of space missions for the Jet Propulsion Laboratory (JPL).

Smith's case is particularly interesting. In 1991, after moving on from Pixar, he started a company called Altamira. With two partners, he devoted a huge amount of effort over a two-year period to create Altamira Composer, a new kind of image-editing and composition program more flexible than Photoshop. It was marketed for nine months – then withdrawn when Microsoft acquired Altamira and invited Smith to come on board.

I'd like to know why a diehard nonconformist entrepreneur would suddenly sell his brainchild and move to Redmond. I'd also like to know what Microsoft had in mind when it acquired SoftImage (which animated the dinosaurs in *Jurassic Park*) and Vermeer (which developed FrontPage software) and RenderMorphics (a supplier of 3-D application programming interfaces).

But let me back up for a moment.

The insidious danger of nerd fever is that even if you're not directly hooked on the tech biz, its obsessional priorities tend to be contagious. I'm reminded of the great mad genius Nikolai Tesla, who once planned to build huge towers transmitting voltage directly to consumer devices. Something like that seems to be beaming out of Microsoft, except it's a psycho-voltage that works on the *brains* of consumers, causing them to resonate sympathetically with the value system of William H. Gates III.

This "Redmond voodoo" is the only way I can explain events such as last year's hysteria over Windows 95. In rational terms it was a fairly boring operating system,

basically a Mac clone 10 years too late and far less elegant or powerful than Nextstep. But rational terms were never even considered as millions of consumers felt a sudden craving for a Start button and menus that popped up from the bottom of their screens instead of the top. It was like a modern version of Saint Vitus's dance, which caused 15th-century Italians to go into mad fugues of imitative calisthenics till they collapsed in a state of terminal exhaustion.

Maybe that's the real genius of Gates: Even though he is widely condemned and reviled, he manages to infect millions of people with his values. He makes dull software seem *incredibly important*.

Consequently, someone like Jake ends up babbling like an industry gossip columnist. "Bill's in big trouble, now," Jake tells me, as he stands up and stuffs a copy of *Auto Trader* magazine into his back pocket. "What happened to Apple, it's gonna happen to Microsoft. This Java shit has 'em running scared. You think anyone's gonna buy a new version of Word when you can rent wordprocessing from a Web site for 50 cents an hour?"

Indeed, Microsoft did undergo a massive reorganization this year. Out of four divisions, two were axed, and the head of another took early retirement. An Internet Platform and Tools Division was created just three months after Gates had sworn that it would never be necessary. Five thousand employees were bused to an auditorium where they received a new, heretical scripture regarding the Net: "Embrace existing standards – and extend them."

Could that be true? Well, Blackbird, a highly hyped tool using proprietary standards to put text and graphics on The Microsoft Network, was promptly killed and resuscitated as the Microsoft Internet Studio, which now uses existing standards to create text and graphics on Web pages. A month later, a press release announced that Microsoft's Internet Explorer plug-ins would be compatible with Netscape, and vice versa.

Meanwhile, Microsoft faced new opposition. Apple teamed up with Silicon Graphics to create Moving Worlds, a 3-D environment specifically designed for the Internet. "This initiative represents the first opportunity for users to experience ubiquitous, animated 3-D on the Web," said David Nagel, then Apple's senior vice president of worldwide research and development, now president of AT&T Laboratories. The Moving Worlds standard has been endorsed by more than 50 companies including Adobe, Asymetrix, Autodesk, Borland, Electronic Arts, IBM, Macromedia, Sega, and Sony – but not Microsoft.

It looks as if a future standards battle is shaping up over 3-D on the Net. But – wait a minute, I sound as if I'm touched with Redmond voodoo myself, babbling on like this. Let's keep things in perspective here. Why should

Charles Platt's most recent article for *Wired* was "Americans Are Not as Free as We Think Are" (*Wired* 4.04).

we care about 3-D graphics? Isn't this just another gimmick, another Windows 95, another way of getting consumers to do the techno-biz version of Saint Vitus's dance?

Maybe so, but in this case there's substance behind the hype. The term 3-D doesn't just mean Web-page buttons that look as if they've been carved out of veined marble. 3-D means objects that can move around freely in a video environment that the viewer can enter and explore. In other words, this is the first essential step toward true virtual reality.

The Web is too slow for intensive graphics traffic right now, but that bottleneck isn't going to last forever. Cyberspace is going to happen, and it will need true 3-D. For those of us who have been reading science fiction and waiting impatiently for total sensory immersion in a shared universe, Microsoft's interest in hiring graphics pioneers suddenly seems more interesting.

One thing remains unexplained, though. These pioneers were individualists, yet they surrendered to an organization commonly described (only half jokingly) as the Evil Empire. Why would they go along with that?

Everyone calls it the "campus," and it does have a modern collegiate look, with scores of shoebox-shaped, dormlike buildings scattered amid grass and trees. But there's something artificial about the landscape. The lawns are so well manicured they could be AstroTurf. Little trees beside the gently curving service road are perfectly symmetrical, like clip art from an architect's visualization. The topography is as carefully calculated as Disneyland, without the rides. Behind the tinted glass of the boxy buildings are thousands of tiny offices, each measuring about 7 feet by 10. Really, the campus look is only skin deep. This is not a laid-back academic environment - it's a system contrived to extract maximum brain labor with minimum worker backlash.

The decor inside is a muted blend of pastels, like the hallways of a Hyatt. There's fine art on the walls - Robert Rauschenberg lithographs and 17th-century woodblock prints. Most software companies dump their employees in uncivilized cubicles separated by chin-high partitions, where you have to wear headphones to block the background noise. But not here. It's so quiet you can hear the hiss of air conditioning. No phones are ringing, perhaps because email is the preferred mode of communication. There's no idle chatter among employees, because each person is sequestered behind a solid-core heavyweight door. Half the offices face the outside world, but the rest are internal, like monastic cells, each containing a Softie staring at a screen in solitary contemplation.

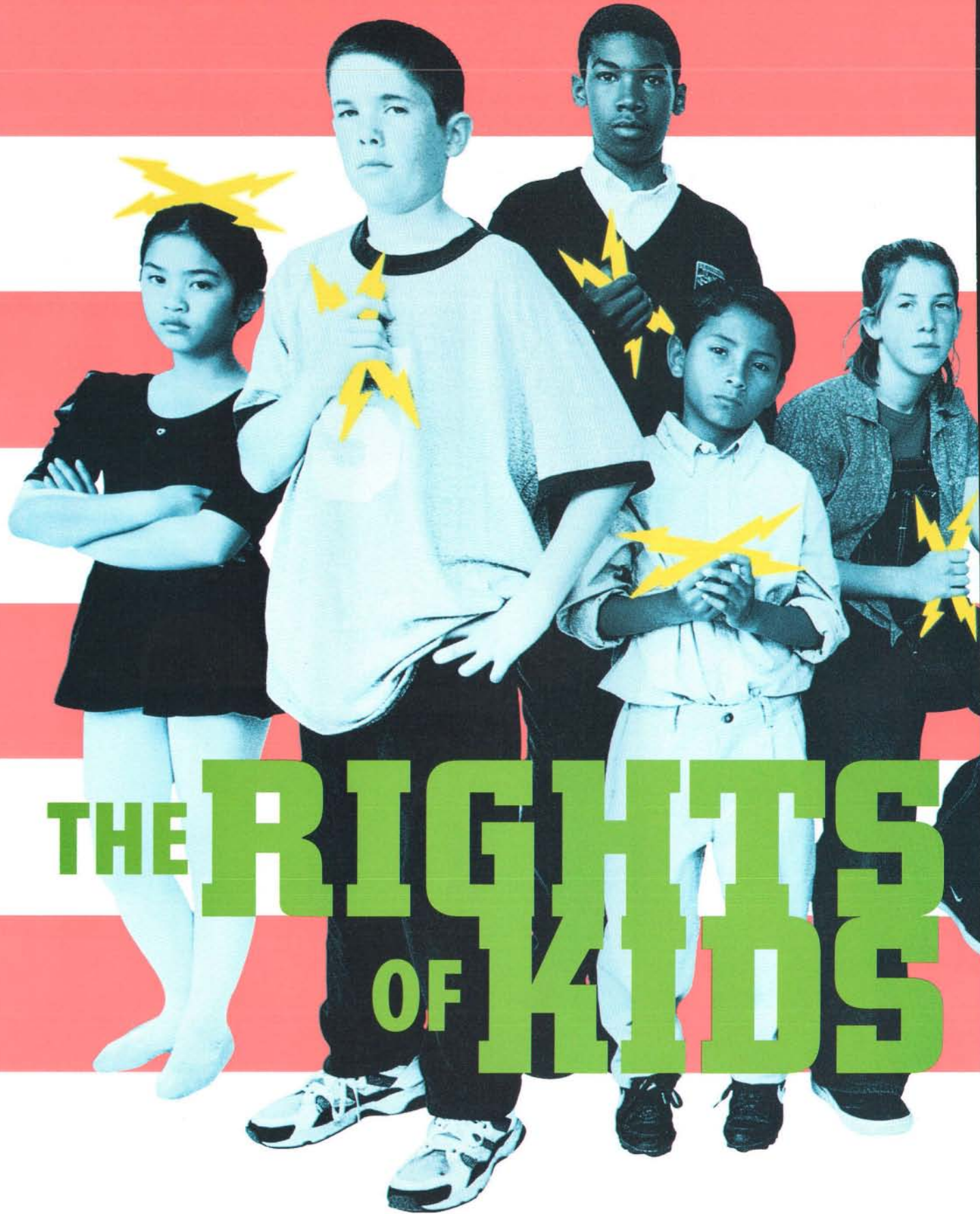
Almost 9,000 isolated individuals meditatively creating - what? Something that doesn't really exist. Patterns, sequences of 1s and 0s. It's about as far from a smoke-stack industry as you can get, but I suspect that 159 ►

Un-Still

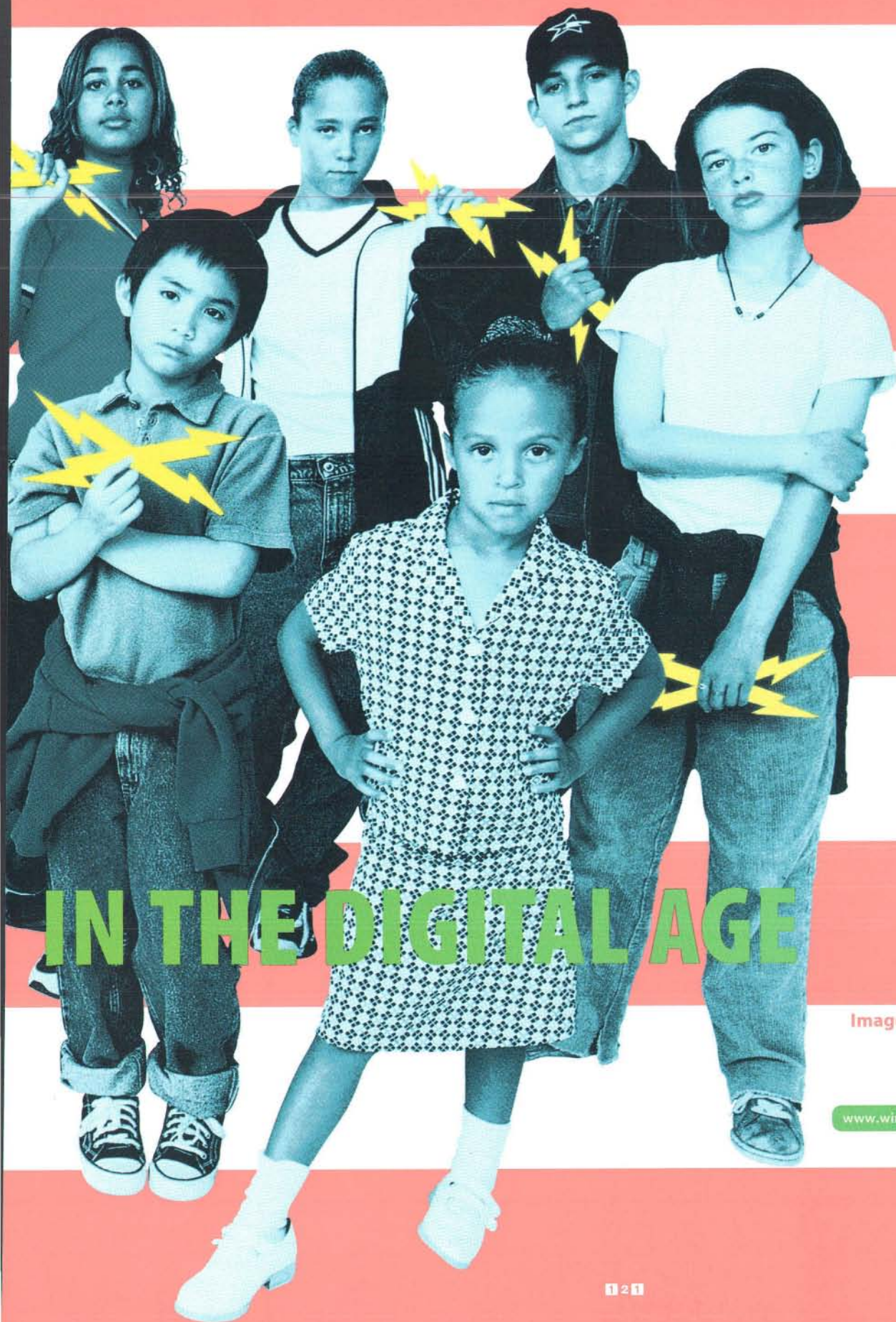
After studying classical photography for six years in Italy, Corinna Holthusen decided that a singular shot just wasn't enough. Now the Hamburg, Germany-based Holthusen uses her Power Mac and Photoshop to scan and assemble up to six different slides that she wants to "let live together." The resulting multitude is captured in one gigabyte; a still life that can seem quixotically, well - unstill. - Tessa Rumsey

Tessa Rumsey is a copy editor at Wired.





THE RIGHTS OF KIDS



IN THE DIGITAL AGE

By Jon Katz

Images by Thomas Heinser

www.wired.com/4.07/kids/

ARTICLE I

Children Lead the Revolution

Children are at the epicenter of the information revolution, ground zero of the digital world. They helped build it, and they understand it as well or better than anyone. Not only is the digital world making the young more sophisticated, altering their ideas of what culture and literacy are, it is connecting them to one another, providing them with a new sense of political self. Children in the digital age are neither unseen nor unheard; in fact, they are seen and heard more than ever. They occupy a new kind of cultural space. They're citizens of a new order, founders of the Digital Nation.

After centuries of sometimes

good for them. Children will never be the same; nor will the rest of us.

The young are the last significant social entity in America perceived to be under the total control of others. Although in recent years society has finally moved to protect kids against exploitation and physical abuse, they make up the only group in our so-called democracy with no inherent political rights, no voice in the political process. Teenagers in particular, so close to adulthood, are subjected to sometimes intolerable controls over almost every aspect of their lives.

In part, that's because fears for children are manifold, ranging from real danger (assault, molestation, kidnab-

demic, those fears for children seem not only valid, but understated. But for middle-class families that consume much of this controversial popular culture, such fears seem misplaced, exaggerated, invoked mostly to regain control of a society changing faster than our ability to comprehend it.

The idea that children are moving beyond our absolute control may be the bitterest pill for many to swallow in the digital era. The need to protect children is reflexive, visceral, instinctive. All the harder, then, to change.

ARTICLE II

A New Social Contract

Three centuries ago, a stunning new idea was introduced

first applied to men, usually white men. Bit by bloody bit, the idea has encompassed other groups, but it has yet to be applied at all to children.

John Locke, the 17th-century English philosopher and essayist, is most remembered for that influential political



THE LEFT AND RIGHT ARE BOTH CYNICALLY TO ADVANCE

MEANWHILE, THE DIGITAL COMMUNITY

IS ALL TOO READY TO SELL OUT

CHILDREN IN ORDER TO SAFEGUARD

THE RIGHTS OF ADULTS.

But, as parent Jon Katz points out,
kids have rights too –
especially in the digital age.

benign, sometimes brutal oppression and regulation, kids are moving out from under our pious control, finding one another via the great hive that is the Net. As digital communications flash through the most heavily fortified borders and ricochet around the world independent of governments and censors, so can children for the first time reach past the suffocating boundaries of social convention, past their elders' rigid notions of what is

Jon Katz is a contributing editor of Wired and author of The Netizen's "Media Rant" on HotWired. His next book, Virtuous Reality, will be published by Random House in January. He can be reached at jdkatz@aol.com.

ping) to such perceived – but often unprovable – perils as the alleged damage caused by violent or pornographic imagery, the addictive nature of some new technology, the supposed loss of civilization and culture.

In some parts of America, particularly amid the urban underclass where violence and economic hardship are epi-

to the world: No one has the right of absolute control over others. People have the inherent right to some measure of freedom. Rules should be agreed upon, not imposed. Although this notion has become our most cherished political value, in the 17th century it existed in practice nowhere on the planet. When it did spread, slowly, it was

argument: People have some say in the way they are governed. Locke preached that people naturally possess certain rights – life, liberty, and property. Rulers, he wrote, derive their power only from the consent of the people they rule. Government, then, is essentially a Social Contract: subjects give up certain freedoms and submit to the authority of government in return for just rule, the safeguarding of what is rightfully theirs. The ruler holds power only so long as he uses it justly. If that sounds familiar, it's because Locke's intellectual fingerprints are all over the Declaration of Independence and the Constitution.

Locke's contract requires mutual responsibility. If the

government violates the trust placed in it by the people, if rulers "endeavor to take away and destroy the power of the people or to reduce them to slavery," then government forfeits the power the people have placed in it. An arbitrary or destructive ruler who does not respect his subjects' rights is "justly to be esteemed the common enemy and pest of mankind and is to be treated accordingly."

The idea of a Social Contract emphasizing mutual responsibility rather than arbitrary power seems especially relevant to the rights of children and the extent of parental authority, particularly in the midst of our raging civil war over culture and media.

Children are being subjected

the essay "Some Thoughts Concerning Education," Locke argued for the moral education of children rather than the arbitrary imposition of rules. Children, like adults, were entitled to some measure of freedom because that was appropriate to their status as rational human beings. Parents' authority should not be severe or arbitrary, he wrote, but used only for the help, instruction, and preservation of their offspring. It is eventually to be relinquished.

The adult world seized on Locke's basic concepts of individual liberty and over time established political and legal rights. The French and American Revolutions transformed the politics of the world in ways that are still being played

development and learning, and the level of parents' patience, thoughtfulness, and resources vary too widely to set forth strict rules. Five-year-olds aren't like 15-year-olds. And when it comes to culture, at least, boys are often not like girls.

But that's why the notion that all children possess some basic rights in the digital age is critical. Their choices ought not to be left completely to the often arbitrary and sometimes ignorant whims and fancies of individual educators, religious leaders, or parents, any more than people ought to be subject to the total control of kings. Parents who thoughtlessly ban access to online culture or lyrics they don't like or understand, or parents who exagger-

Blocking, censoring, and banning should be the last resort in dealing with children, not the first. Particularly if children have been given the chance to develop a moral and responsible ethic and are willing - as in Locke's notion of the Social Contract - to meet their responsibilities.

ARTICLE III

The Responsible Child

The cultural disputes between children and their families cannot be solved by extending the legal system into the home. No legislator can define every circumstance in which a child is entitled to assume more responsibility for his or her decisions. And wildly varying family values make it difficult to spell out universal rights.

EXPLOITING CHILDREN THEIR OWN IDEOLOGICAL AGENDAS.

to an intense wave of censorship and control - V-Chips, blocking software, ratings systems on everything from movies and music to computer games. Cultural conservatives like Bob Dole and William Bennett are forging a national political movement out of their desire to put cultural blinders on the young. President Clinton has enthusiastically embraced the idea that parents should have the right to block kids' TV programs. In this struggle, the young are largely alone; few political, educational, or social entities have lent support or defense.

Locke challenged the belief, widespread then and now, that the power of parents over children is "absolute." In his *Two Treatises of Government* and

out today. But children have lived almost completely outside these notions - and for understandable reasons. Children's rights are, in fact, vastly more complicated.

Any sort of legislated political emancipation for the young is almost out of the question. Children are unlikely to win the sweeping legal protections granted other minorities. But some of the most powerful movements in our political history - civil rights, feminism, gay emancipation - were moral as well as legal struggles. With children, the idea of expanded freedom also begins as a moral issue.

The lives of children are far too complex to generalize about. Degrees of maturity, emotional stability, rates of

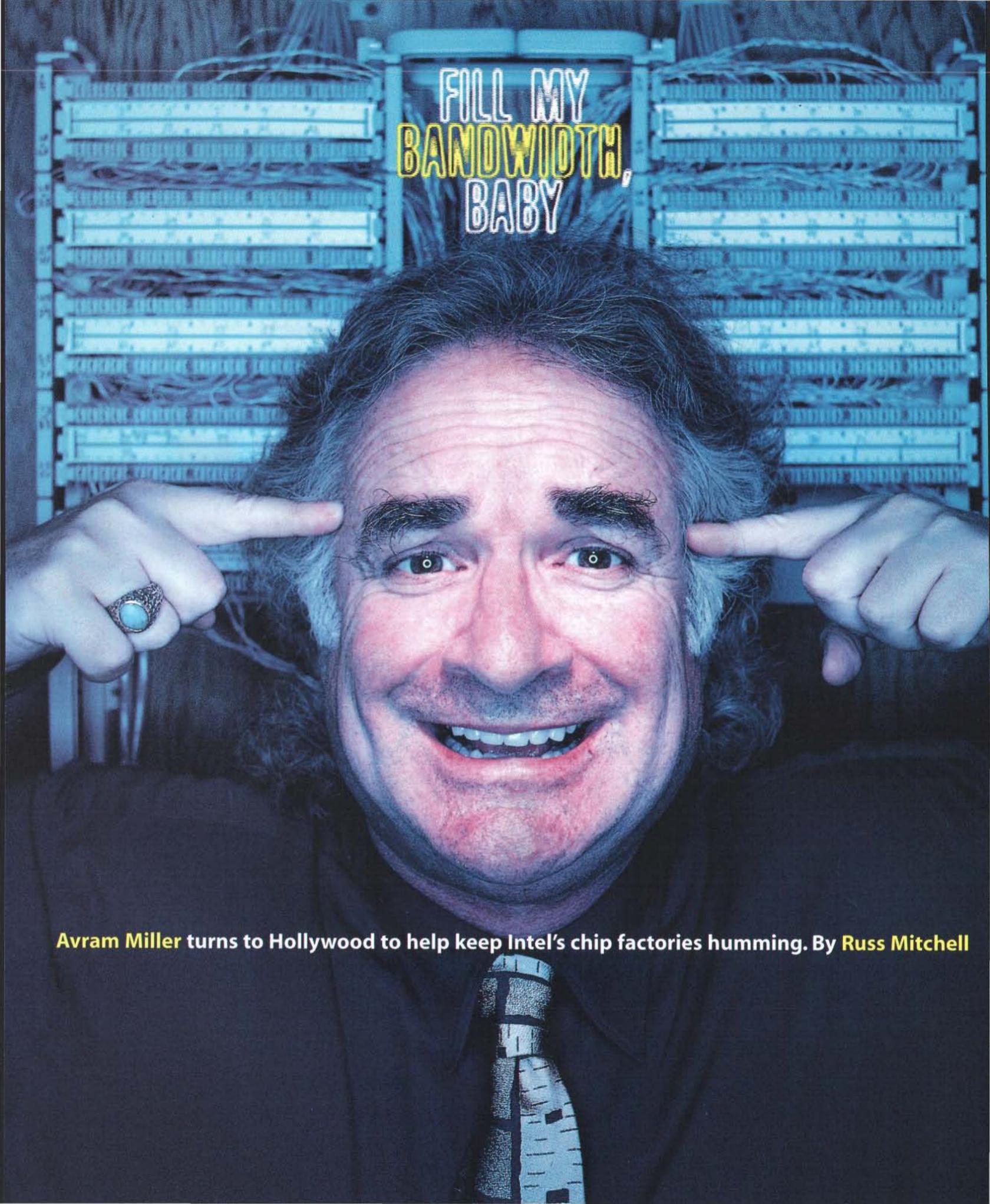
ate and distort the dangers from violent and pornographic imagery are acting out of their own anxiety and arrogance, imposing brute authority. Rather than preparing kids for the world they'll have to live in, these parents insist on preparing them for a world that no longer exists.

The young have a moral right of access to the machinery and content of media and culture. It's their universal language. It's their means of attaining modern literacy, which in the next millennium will surely be defined as the ability to access information, rather than to regurgitate the names of the presidents. It may mean the difference between economic well-being and economic hardship.

But we as adults and parents can start to understand what a new Social Contract with children looks like - beginning with the notion of the Responsible Child. He or she is a teenager, or almost one, who meets certain criteria:

- ★ She works to the best of her ability in school. She's reasonably responsible about her education and functions successfully in a classroom.
- ★ She's socially responsible. She avoids drug and alcohol abuse and understands the health dangers of smoking.
- ★ She does not harass, steal from, or otherwise harm people, including siblings, friends, fellow students.
- ★ She carries her weight at home. She does the tasks and chores she has agreed on or has been assigned to do.

The Responsible Child 166 ►



FILL MY
BANDWIDTH,
BABY

Avram Miller turns to Hollywood to help keep Intel's chip factories humming. By **Russ Mitchell**

Wired: What does an engineering company know about media?

Miller: We don't know much about it. We don't have to. We have no intention of becoming a media company. What we're pretty good at is judging whether or not a company has its motivator. Are they smart or not smart?

Why get involved at all?

Intel's interest is pretty simple. We need to grow the market for personal computers. We're making huge financial commitments by building factories [at least US\$1 billion apiece] for products we haven't designed for markets that don't exist. The question is, Can we get value for those investments?

If there's a real market for new media, why go out of your way to help kick-start it?

The economic value of time. If we grow an extra 10 to 20 percent in one year, we hopefully keep that 10 to 20 percent forever.

How did the Creative Artists new-media lab come about?

We were talking to people at CAA about a year ago. Their clients were getting interested in new media. Things like *Myst* had a big impact. People like Steven Spielberg – and others with kids, say, from 5 to 15 – started playing these things. And they started thinking, “Hmm, look at what I could do.” So they started putting pressure on CAA to help them understand where the technology is going.

The lab is an environment where we can show you how to develop something in this new medium – like a showcase, a window into making an interactive movie. Show them what the Internet is. Hollywood stars feel comfortable walking around the halls of CAA, but they might not want to go to Comdex and play on PCs with the mobs.

What other big-shot Hollywood types have you been working with? Care to drop some names?

No.

Oliver Stone? Susan Sarandon? James Cameron?

I'm not gonna....

Pauly Shore?

Look, we do have interactions with the top-name caliber in LA. It's not just actors, it's directors, producers, cameramen, writers – the writers will play a big role in this.

You've said that the Silicon Valley culture and the Hollywood culture tend to trivialize each other. What do you mean?

I don't mean there's fights. The computer industry has not really understood the importance of protecting content. We tried copy protection of software and it didn't work. So we said what the hell, 30 percent of it

is copied illegally, and we build the cost into our business. But there's a big difference between protecting a piece of program and protecting a movie. A Disney movie might have a life of 20 years. If you alter a program, it doesn't work. If you draw a mustache on Mickey Mouse, you've defaced him.

On the other side, I don't think the content world has understood how difficult it is to do some of the things they want to do with technology.

Your interest in content assumes that you think the bandwidth is available to deliver compelling programs.

We're going to start seeing higher and higher bandwidth nets – ATM, ADSL, satellite delivery. But in the next several years, most people will still connect through 14.4 and 28.8 modems. With the advent of DVD and hybrid applications where you combine CD with online service, you'll be able to provide high-quality experiences even at those speeds. Long term, we do need a high-speed connection.

Movie people are getting hip to new media, but what about TV broadcast execs? Do they get it?

Not really. But they're businesspeople driven by ad revenue and by viewing time. There's evidence that people with PCs spend less time with their TVs. If someone demonstrates that ad revenue can be achieved from Internet programming, these guys are going to get it.

Why are the phone companies so brain-dead about ISDN?

Things move slowly in the phone industry. They don't think they're being slow. I'm not being unkind. Each industry has its own rhythm.

But they're blowing it, aren't they?

They are at great risk.

What's the coolest project you've got going?

The thing we're doing that's furthest out there is Willisville, with Allee Willis (who wrote the theme song for *Friends*) and Prudence Fenton (an animator from *Pee-wee's Playhouse*). What sets them apart is their understanding of character development and their understanding of how people can affect the behavior of characters. We're working with OnLive! Technologies, too. It's an amazing experience to meet people through their avatars in the 3-D world. It becomes very real to you.

And it sucks up a lot of processing power.

And it does suck up a lot of processing power. ■ ■ ■

Avram Miller describes the personality of his engineering-trained colleagues at Intel Corp. as “sequential linear concrete.” A jazz pianist trained in music theory, the 51-year-old Miller fits a more improvisational profile. As corporate vice president for business development, he's sounding out new ways to supercharge demand for personal computers, nearly 80 percent of which are powered by Intel micro-processors.

His main theme is new media. He's spent the last few years pushing the development of cable modems to speed Web download times. Now, with cable modems in market test stage, he's investing Intel's money, technology, and expertise in new-media start-ups. By late summer, Intel and Creative Artists Agency, the Hollywood talent kingpin, plan to open a multimedia demonstration lab in Los Angeles. The idea is to hasten the arrival of rich programming on the Web – and, not incidentally, to sell more chips.

Russ Mitchell (russ@wired.com) is managing editor at Wired.

IT'S 4:30 on a Monday afternoon in SoHo, and a meeting of Voyager's Web group is getting under way in the multimedia company's fifth-floor conference room. Bob Stein, one of Voyager's four principal

THE TEACHINGS OF BOB STEIN

founders and its reigning guru, is struggling to uncrate a large-screen TV and hook it up to a laptop. As the 19 group members, almost all in their 20s, sift into the room, he insists that they ditch the center conference table – too corporate. When someone points out that they'll have no place for the communal bag of pretzels, he settles for having everyone push their chairs back from the table, forming the ragged semblance of a circle.

Voyager has just revamped its Web site for the third time



The cyberlord of Voyager is either the most far-out digital publishing visionary in the world or the least effective businessman alive – or both. By Amy Virshup

in as many months, going from a high-concept electronic gallery to an even higher concept blueprint to a utilitarian set of menus and buttons – which Stein likes best. Today's meeting has two purposes: to congratulate all those who worked on the new version, and to make the first selection for its Staff Pick of the Week link. After a quick tour of the site's new architecture, Stein says, "Last week we discussed not doing just a plain vanilla pick, but one with some chunky annotation – some explanation from the collective

editorial mind of Voyager."

A couple of suggestions are thrown out: a site called *Traffic*, *Bomb* magazine, the ezine *Feed*. "How about *Beer Frame* magazine – do they have a Web site?" asks Nancy Bauer, a laserdisc and CD-ROM producer and one of the few women in the room. Someone else suggests "Personal Dictionaries," a series of photographic portraits paired with the subjects' computer dictionaries – "We all loved it," he says. For a moment, it looks

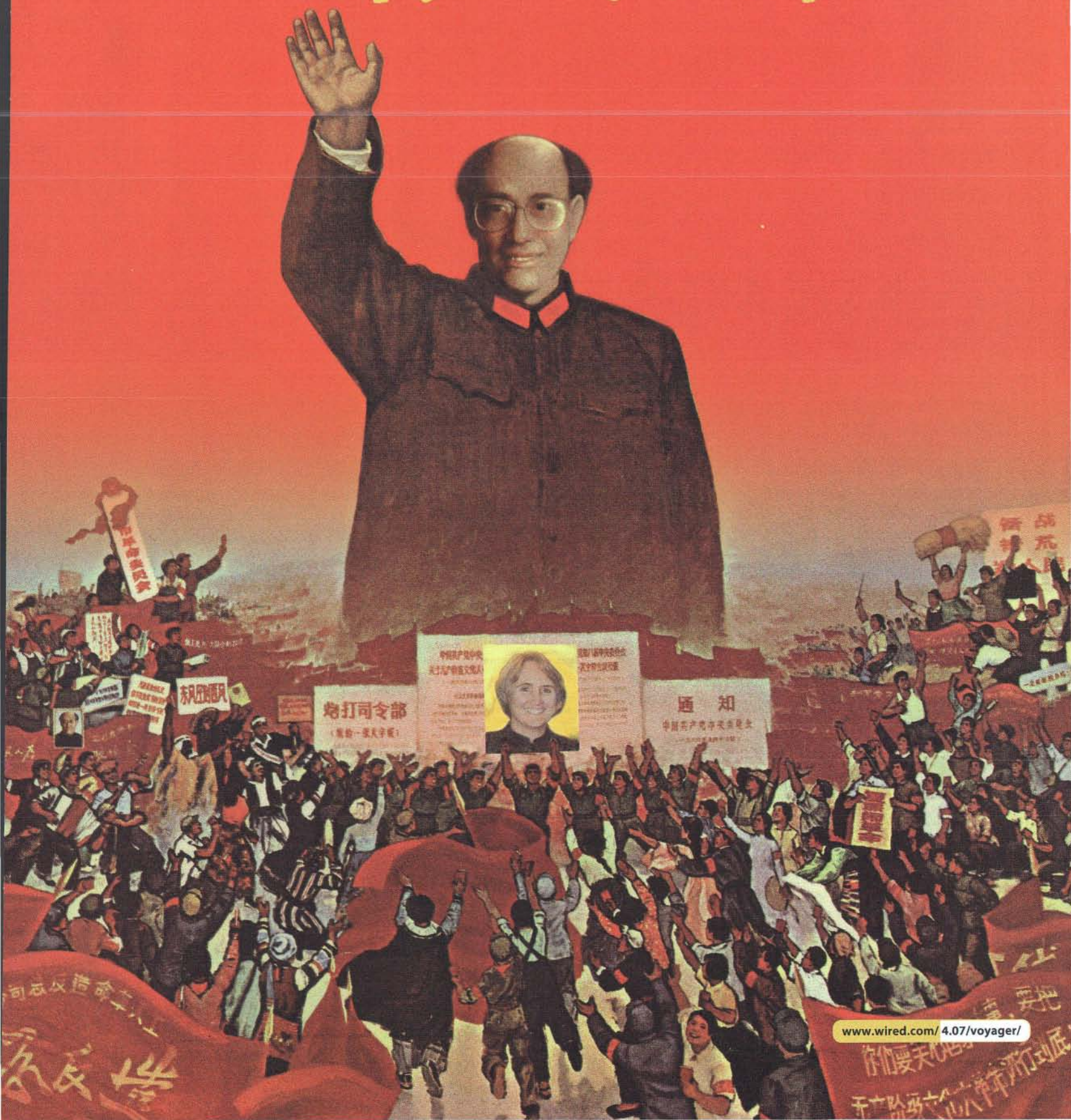
like the decision is going to be made this quickly. But Bob Stein won't have it. "Let's not make this easy," he says, and then he gets down to his real agenda: "What I'd like is to come in here on Monday afternoons and have a *really* vicious argument."

Therein lies a clue to both Stein and Voyager's notion of progress since the company's founding a little over a decade ago. "Bob likes struggle for struggle's sake," says Jonathan Turrell, a Voyager part-

ner. "He prefers process to end results." Or as Stein himself says, "I've always thought the most interesting project at Voyager was Voyager." The company has consistently lived that philosophy, as it's shifted from making laserdiscs to producing CD-ROMs to, lately, publishing on the Web. Along the way, the company has moved from California to

Amy Virshup (amyv@pipeline.com) is a freelance writer in New York.

共存繁荣



New York, taken on and fallen out with a corporate partner, and unceremoniously broken with one of its four founders, Stein's former wife, Aleen, who now runs her own multimedia publisher, Organa. (Aleen remains a partner at Voyager.)

Throughout it all, Voyager has remained resolutely idiosyncratic. Probably the leading proponent of the book model in multimedia, it is one of the few producers to offer actual *ideas* on CD-ROM. Its best products, like the history disc *Who Built America?*, add layers of sound and image to authorial concepts, deepening one's understanding of, say, the Triangle Shirtwaist fire (with photos from the legendary Yiddish daily, *Forward*) or of the social revolution wrought by the telephone (with an old vaudeville skit featuring an immigrant and his landlord). Voyager has put out CD-ROMs by performance artist Laurie Anderson, conceptual rockers The Residents, and contemporary composer Morton Subotnick. It published the electronic version of Art Spiegelman's graphic novel of the Holocaust, *Maus*. And last summer, when

project costs about \$150,000.

Its sales are similarly modest: Voyager's first disc, *CD Companion to Beethoven's Symphony No. 9*, has sold more than 130,000 units, but 100,000 of them were sold by Microsoft, which put out the Windows version. Voyager's own sales leader, *A Hard Day's Night*, has sold 100,000 copies, while Anderson's *Puppet Motel* – a Mac-only disc – has racked up just 10,000 in sales, which is not bad by Voyager standards. Part of the reason for the company's low sales figures is that it has never been able to crack the software distribution channel. The company has proved a natural for bookstores – as the manager of a Manhattan Barnes & Noble puts it, "There's Voyager, and then there's everybody else." (He's not just speaking metaphorically: Voyager has its own section in the store – everyone else's titles share shelf space nearby.) But in software and music stores, Voyager is just another competitor, and a weak one at that. The company doesn't

chain a book he needed to his desk. Lately, as the staff has dwindled – according to one staffer's count, Voyager had 84 employees in September 1995 and has about 65 today – there's been less fighting in the company's three floors of loft space across from the Guggenheim Museum SoHo. During one week in April, six employees left or were fired, including sales and marketing head Bill Heye, who is joining an Internet start-up.

Starting out with the electronic rights to *King Kong* and *Citizen Kane*, Stein (top) sold Janus Films's Jonathan Turrell (above) on the promise of the laserdisc.

But these are not good times for even the richest CD-ROM producers, from Brøderbund Software to Microsoft to Disney Interactive, all of which, as Ted Pine, chair of the Vermont-based research and consulting firm InfoTech, points out, have brand equity and deep corporate pockets. "Most people publishing CD-ROMs last year lost money," observes Voyager alum Michael Nash, who now runs Inscape,



But almost two-thirds of those sales were of applications – either business programs or games – not "content-based" discs. "If you're counting CD-ROMs that have been successful and made money, you don't run out of fingers," says Mark Stahlman of New Media Associates, a Manhattan-based research firm. Squeezed between the technical promise of DVD (vaporformat though it may be at the moment) and the immediacy of the Web, the life expectancy of the CD-ROM now seems brutally short.

"It's an industry of haves and have-nots," says Pine, who thinks the industry will shake out much as other media – from print to music to television networks – have, with a handful of really big players and a handful of quality independents who succeed because they've been able to create a niche franchise. According to Pine and other

the first consumer CD-ROM –

journalist and political activist Mumia Abu-Jamal was facing imminent execution, Voyager turned out a disc of his writings, interviews, and audio commentaries in just five weeks.

Voyager has done all this on budgets that would be considered laughable anywhere else. While the average industry budget for a documentary is in the US\$400,000 range, and the cost of a virtual-world game generally starts around \$1 million, Voyager spent \$35,000 on the Mumia disc – and its average CD-ROM

Voyager arguably created

Beethoven's Symphony No. 9 ...

have the promotional cash to support its titles. The entire sales and marketing budget for 1996 was about \$2.5 million. That's less than the production costs of many games.

In other ways, Voyager is more typical of the industry as a whole. Idealistic young staffers talk casually of pulling all-nighters at their computers and routinely battle each other for editing equipment, monitors, even chairs. One producer went so far as to

the multimedia publisher backed by Time Warner. "I'd say 90 percent of them." The technology has never lived up to its hype, and though producers have been living a kind of *Field of Dreams* fantasy – if manufacturers install enough CD-ROM drives, people will come – it hasn't happened that way. CD-ROM sales through the first three quarters of 1995 topped \$932 million, according to the Software Publishers Association.

analysts, distribution will be an even more pressing issue for CD-ROMs as sales move into mass-market retailers like Wal-Mart, which demand what Pine calls "critical distribution mass – you have to have enough size, and you have to have enough titles."

When you consider that Voyager is chronically undercapitalized, lacks distribution muscle, produces esoteric titles, and – well, things look bleak. But then things have pretty much always looked bleak for Voyager, which ran through a 1994 \$6.7 million cash infusion in less than six months, using half of it to pay off accumulated debts, and which for years has limped along just under profitability on annual revenues of about

\$12 million. "There have been reports of Voyager's demise since 1991," says UCLA professor Robert Winter, who authored four outstanding music CD-ROMs with the company before starting his own

the company has pretty much defined high-quality film disc production with its Criterion group, which has produced more than 250 laserdiscs, from *Rashomon* to *Blade Runner*, all in their original aspect

... and has pretty much defined

high-quality film disc production with Criterion.

house, Calliope. "Voyager's middle name is phoenix."

IN 1989, Voyager arguably created the first consumer CD-ROM – *CD Companion to Beethoven's Symphony No. 9*, which combined a Vienna Philharmonic recording with Winter's commentary, a biography of the composer, and a line-by-line reading of the score. And

ratios and many with supplemental materials like storyboards, parallel commentary tracks, even alternate cuts.

Yet Voyager, partly by its own design, has never quite fit in the new-media world. It is not especially high tech. It is also probably the only new-media company to forsake California for New York, a move made in 1993 because Stein wanted to be closer to Manhattan's creative community, including its publishers. (Office scuttlebutt had it that Stein moved the company to be closer to his New York-based girlfriend. "It would have been a lot easier to move my relationship," he dryly notes.) In a field in love with 3-D graphics, Voyager likes words – Stein has been known to show up at high-tech conferences in a T-shirt bearing

made almost none. As it happens, quite a few people think Stein almost prefers not to make a profit. Stein himself enjoys recalling the scene at MacWorld one year when, on entering the hotel bar, he found most of his staff waiting; they'd unionized, they

told him, and their first demand was that the bosses start acting like capitalists.

The question of Stein's claim to visionary status is hotly debated, at least within the New York tech community. "I thank God for Voyager," says Red Burns, chair of New York University's Interactive Telecommunications Program. "The moment Bob hit New York, I didn't walk – I ran to ask him to teach." Mark Stahlman, meanwhile, calls Stein "a pain-in-the-ass Maoist who doesn't know how to run a company" and says Stein has played almost no part in the growth of New York's Silicon Alley. Not true, counters Steven Johnson, co-founder and editor in chief of *Feed*, who maintains that Voyager's move from Santa Monica to SoHo "is one of the key moments in the whole New York new-media, Silicon Alley story." Voyager, he says, is champion of the tech-for-content's-sake attitude of the New York industry. Rounding out the debate in characteristic style, Stein pronounces that Silicon Alley is "bullshit" and a "complete invention of the press." ("Well, right," Johnson gamely responds upon hearing this. "That's Bob. He could take credit for it, bask in the glow, but he'd rather denounce the whole thing.")

Within Voyager, the word on Stein is similarly divided:



Voyager's early years (from top): an office at naptime; Aleen shrink-wrapping Criterion discs; Bob and his father, Bill, at a trade show; a living room production line; gathering for the eclipse.



the slogan "Text: The Next Frontier." In a business whose politics is largely confined to libertarian demands for free speech on the Net, Stein is a committed radical who has publicly sympathized with Peru's Shining Path guerrillas. And in an industry where making money is routinely equated with being a genius, Stein and his partners have

There's Bob's a genius. And there's Bob's a genius, but.... Returning from a sales call recently, Heidi Schwenzfeier, a young sales and marketing staffer, spoke of the "sense of mission, faith, and belief" at the company. "We feel like we're doing something worthwhile – it's an endeavor," she said. (Nevertheless, Schwenz-

in the manner of some families: openly, with much kicking and screaming. But in 1996, that metaphor no longer really works. For one thing, Voyager has lost its literal family: Mom and Dad have split up, and the kids have moved on. Nineteen-ninety-five opened with Aleen's divorce from company operations, at a January

on their own.) He also informed them that the company had been running \$100,000 in the red each month, a loss that had been made up by loans from Janus Films, an independent distributor of foreign films owned by the two other Voyager founders, Turrell and Bill Becker. That borrowing could not continue.

It was the first time that Stein had put a dollar figure

there was a shared place to start from," Stein began. After giving a précis of his memo, he opened the floor to questions and comments. When someone asked about setting up a nonprofit within the company, the guy beside me turned and asked his friend sotto voce, "Is there a for-profit arm of Voyager?" But other staff members asked earnestly about sales ("essentially flat," Turrell told them), the impact of DVD ("we are prepared to go into it," Stein said), and the chances of getting more backing from Holtzbrinck, a German publishing company that had paid \$6.7 million for 20 percent of Voyager back in March 1994 (unlikely). Stein and Turrell, along with Beck-

Stein told employees that

Voyager had been running \$100,000

in the red each month.

feier was one of the staffers who left in April.) A less enamored employee called Stein "a talented hairdresser for CD-ROMs," with "a dismissive attitude" toward the actual work necessary for production, which he was said to regard as "an annoyance, a pesky intrusion of the mundane into his vision." Many people who work for Stein mention his tremendous intellectual passion and enthusiasm – and an almost equal number cite his short attention span and complete disregard for detail.

What these two groups can agree on is that Voyager suffers from a lack of training and resources, coasting along on young labor and paying salaries that are about half the industry average. The company's in-house nickname is Voyager U. – i.e., it's a good place to land at 23 after, say, ITP or the Radcliffe Publishing Course, learn Photoshop and Director, and then "graduate."

Talk to anyone who's ever worked there and the word *family* will inevitably come up. Equally inevitably it will be preceded by *dysfunctional*. In some ways, Voyager is like a family – messy, contradictory, complex. It conducts its affairs

staff meeting that has been characterized by various attendees as "gut-wrenching" and "a public execution." More important, the year ended with a cash crunch so severe that Stein was forced to curtail the entire Voyager operation. More than 10 titles on Voyager's production schedule were cut, including two big-ticket CD-ROMs that would have cost \$500,000 to produce. The company also dropped a handful of deals it had been negotiating.

The staff meeting to announce Voyager's own personal downsizing was held on a Friday afternoon just before Christmas. For weeks, rumors had been flying that a big lay-off was imminent, fueled by a series of closed-door meetings of the company's executive committee. Earlier that day, Stein had sent the staff a memo saying they weren't going to lose their jobs that afternoon – "massive layoffs were considered but rejected at this point," Stein's note reassured, sort of. (The Voyager ethos dictated that employees whose projects had suddenly vanished would either find new work within the company or find the door

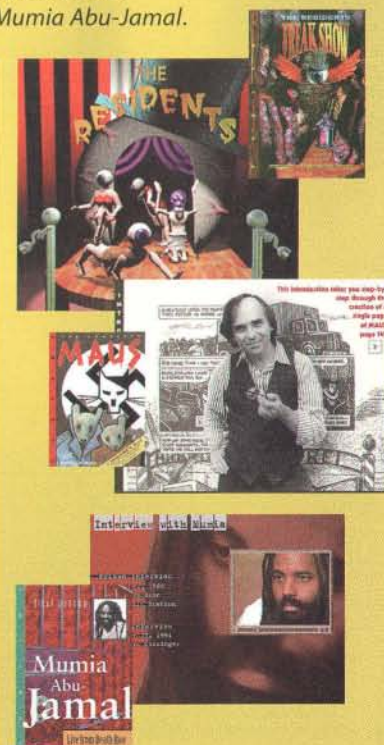
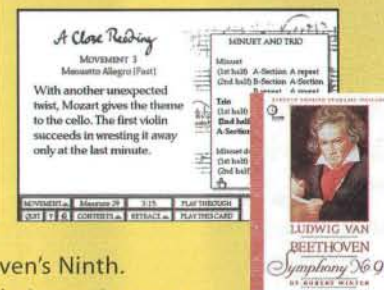
on the company's shortfall. In order to get through 1996, he announced, Voyager would be making "deep and painful" cuts in CD-ROM production while moving aggressively onto the Web. There was one note of sweet solace, for those at Voyager who make laser-discs. The Criterion Collection, long viewed as the company's backwater, had become its cash cow, earning \$1 million on sales of \$5 million in 1995.

Above: Voyager's first was Beethoven's Ninth. Other CD-ROMs that scored include (opposite page and below) *Puppet Motel*, *Who Built America?*, *The Residents' Freak Show*, *Maus* (shown with Art Spiegelman), and *First Person: Mumia Abu-Jamal*.

(Overall, Voyager lost \$1.7 million in 1995.)

The staff, in jeans and knit caps, black leggings and hiking boots, gathered in a loose circle. The wiry Stein, then 49, with ascetically cropped hair and oversize glasses, perched at the center of the open loft space, on one of the folding tables that at Voyager pass for desks. Turrell, dark-haired and boyish at 36, sat beside him. Becker, who is in his late 60s, had shown up, too.

"Given the extent of the rumor mill and the gravity of the issues being discussed, we wanted to make sure that



er's son Peter, who runs Criterion, talked about Voyager's proud history of creating a high-quality product and its insistence on not following the market. With that, a producer named Reid Sherline offered up a bit of heresy from the back of the room. "I think we're too product-driven," he said. "Questions about cost, market research, sell-through, or profit and loss – the whole time I've been here I've been discouraged from gathering that kind of data. If it's our job

committee to manage operations until January 1995. And that last October the company hired its first financial officer, Rebecca Krause, who proceeded to unveil its first budget, for fiscal 1996. Then came the sudden year-end production cutback. And two months later, in February, Stein would tell the staff that he and Turrell had thought to improve matters by negotiating to sell Holtzbrinck's stake to a West Coast high-tech investment group, though it was unclear if the German company actually wanted to sell. But that deal had fallen apart, Stein explained, after the potential investors decided they would rather buy Voyager outright.

It's easy to see why. A former Voyager employee recalls of the Holtzbrinck deal, "The problem was that even though Bob was expecting to get a lot of cash, he really didn't want to give up any control." According to investment adviser Joel Koblentz, who studied Voyager at the behest of The Markle Foundation, the company "had already spent the money by the time they got it." Holtzbrinck, whose American properties include Henry Holt and *Scientific American*, was apparently not clear about what it

according to the former employee. Some of it also went to Laurie Anderson's tour that summer, which Voyager underwrote. "Bud Light sponsors people's tours," says Michael Nash, still in wonder at the idea. "Little multimedia companies don't sponsor people's tours." That year, Voyager lost more than \$2 million.

All of which left the Voyager employees that December day confronting a fundamental question: Even if they would prefer to work at a money-making concern, did Stein want to run one? And, more to the point, could he?

IN 1980, Bob Stein was a former student radical, political organizer, and confirmed Maoist who had completed a BA from Columbia, an MA from Harvard, and about a week's worth of work on a PhD. He also had a wife and a family. He and Aleen had married in 1978; she already had two children, and they'd eventually have two more together. Living in LA, Stein had reached a point where he "realized that fundamental change – as in revolution – was a long way off, and I couldn't wait that long." He worked as a waiter and went

Over the next few years, Stein went from one consulting gig to another – for *Encyclopaedia Britannica*, for Alan Kay's Atari Research Group, for Warner executive Stan Cornyn – preaching the gospel of the electronic future. Finally, in 1984, the Steins bought the electronic rights to two classic movies, *Citizen Kane* and *King Kong*, for \$10,000 and went into business with a former Warner exec named Roger Smith. They called their new venture the Criterion Collection. Looking for more product, they approached New York-based Janus Films, run by Becker and Turrell. "Roger and Bob never came together, they always came separately," recalls Turrell, who until recently worked out of Voyager's satellite office in Irvington, New York, a half-hour's train ride from Manhattan. "Roger would show up in three-piece suits and take me to very expensive lunches. Bob would show up two weeks later in his pajama pants, we'd go out for pizza, and he'd say, 'You have a couple of bucks you could lend me?'" Not too surprisingly, the Stein-Smith partnership soon fell apart.

But about three months later, Turrell got a call from

to get us through to the other side, we *have* to be trained to think about those things.

"Break-even points, I don't even know how to calculate them," Sherline went on. "I feel like I've been actively discouraged from asking about these things."

"This is obviously a problem, and we have to deal with it," Stein said. "Not we –" and here Stein waved his hand to take in the management group gathered around him.

"I have to deal with it," Sherline shot back.

The nature of this exchange becomes clearer when you understand that Voyager didn't create an executive

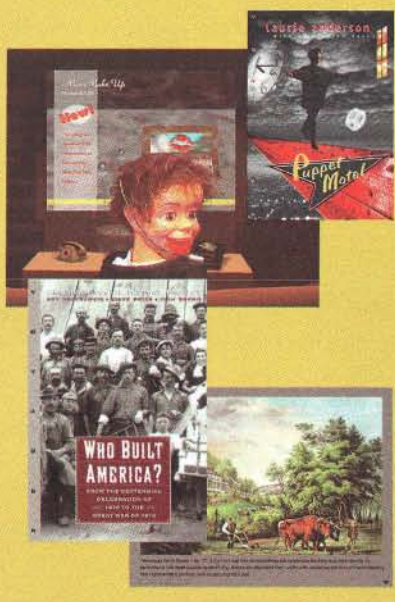
was getting into or about what it expected to get out of the deal. A significant chunk of Holtzbrinck's cash infusion went to paying off old debts, and the rest was parceled off to production, hardware, a software-channel marketing effort, and a costly direct-mail catalog. "The week after the announcement, Bob took on a number of really expensive projects and basically blew all the money that was left,"

Did Stein want to run a moneymaking concern?

More to the point, could he?

looking for his future in the public library. He found it in a handful of articles in magazines like *New York* and *Publishers Weekly* that touted the capabilities of a new technology involving optical videodiscs and the work of a little-known media lab at MIT. "I read until I got interested in something," says Stein. "And I got interested in this."

Stein. "He said, 'Did you see what we did?' Roger had in fact sent me *King Kong* and I'd watched it. I said, 'King Kong. Movie. Seen it, been there, done that.' He said, 'You don't get it. Let me come up to the office and show you something.' He brought *Citizen Kane*, and he showed me the opening scene – of the window in the Hearst 172 ►



Wired: Is architecture behind the times?

Koolhaas: Architecture has been defined in terms of one activity, and that activity is adding to the world. A few years ago I realized the profession was as if lobotomized – it was stuck conceiving of itself only in terms of adding things and not in terms of taking away or erasing things. The same intelligence for adding ought to also deal with its debris. It's a very depressing phenomenon that we can deal with decaying conditions in the city only by inventing weak attempts to restore them or to declare them historical. It would be much more powerful and creative to use other tactics, such as taking away something and then building something entirely new. One of the ambitions of *S,M,L,XL* is to extend the repertoire, which also includes, for instance, not doing anything, or asking some-

body else to do something – both of which are, curiously, things that an architect never does.

Maybe because they're not overly appealing options from a business perspective.

But I am not modest, and the ambition to do this is not modest, either. The largest domain in which that sensibility to extend the repertoire is present is the virtual domain, and it's kind of leaving architecture behind.

Where do you see the future of architecture going?

With globalization, we all have more or less the same future, but Asia and Africa feel much more new. I've been doing research in China recently, investigating cities that emerge suddenly, in eight years or so, seemingly out of nothing. These places are much more vigorous and representative of the future. There, building something new is a daily pleasure and a daily occurrence.

You're doing a big project in China now, aren't you?

Yes. Its working title is City of Exacerbated Differences. It is in the Pearl River Delta. It's not a single city but a region inhabited by a cluster of very diverse cities such as Hong Kong, Shenzhen, Guangzhou, Guangdong, Zhuhai, and Macau. Together, they may represent a new model of the megalopolis in the sense that their coexistence, their functioning, their legitimacy is determined by their extreme mutual difference.

What are you learning there?

We've been looking at the average time that goes into designing a building in China and the average number of people who work on it. We discovered that in the area we

were in it takes 10 days – and it's three people and three Apple computers. And it's a 40-story building. Others are done in two days. The work definitely becomes more diagrammatic, but maybe more pure at the same time.

It would also seem likely to produce a less hospitable environment.

I disagree. People can inhabit anything. And they can be miserable in anything and ecstatic in anything. More and more I think that architecture has nothing to do with it. Of course, that's both liberating and alarming. But the generic city, the general urban condition, is happening everywhere, and just the fact that it occurs in such enormous quantities must mean that it's habitable.

You make it sound like no one's in charge.

Architecture can't do anything that the culture doesn't. We all complain that we are confronted by urban environments that are completely similar. We say we want to create beauty, identity, quality, singularity. And yet, maybe in truth these cities that we have *are* desired. Maybe their very characterlessness provides the best context for living.

So generic is not a dirty word?

Well, Singapore has succeeded, over the last 40 years, in removing any trace of authenticity. It is a culture of the contemporary. And many Asian cities are like this now, seeming to exist of nothing but copies – in many instances bad copies – of Western architecture. But actually, if you look closely you can perform another reading – you can see, for instance, that these copies are dealing differently with layering and with problems of density.

***S,M,L,XL* – why make a 1,344-page book about anything? Some people have said the book's physical bulk is a deliberate retort to the outpouring of "weightless" digital information.**

Yes and no. What's interesting is that the book form itself has been threatened by a succession of media – film, TV, now electronics. It has survived, but each of these media has profoundly influenced it, changed its nature forever. So, in its physicality, *S,M,L,XL* is counter, but in its conception, it is analog: it is "against" the other media, but at the same time unthinkable without them.

So it wasn't simply your famous love of "Bigness"?

S, M, L, XL – I am passionate about every scale. But in the '70s and '80s, while the world was in the process of enlarging, architecture was subdividing; there was a self-marginalization, a fanatical attention to detail, even a language that was splintering. Bigness already existed, as the outcome of inventions such as steel and air-conditioning, but engineering was still being considered a mere afterthought and not a necessary complement to architecture. And in fact there seemed to be absolutely no conceivable connection between architecture and the driving forces in society. So the reason to consider Bigness was to find a way to align architecture with the bigness of the new climate.

You've also said, "I like thinking big. I always have. To me it's very simple: If you're going to be 175 ►



Fifty-two-year-old Rem Koolhaas, a renowned Dutch architect and co-author of *S,M,L,XL*, the book whose weight everyone is still talking about (6 pounds, The Monacelli Press), is only now making his American professional debut – he's been commissioned to redesign MCA headquarters and its 420-acre Universal Studios lot in Los Angeles. But Koolhaas's fame as an iconoclastic visionary has been growing since the publication, in 1978, of *Delirious New York: A Retroactive Manifesto for Manhattan* (2 pounds, Oxford University Press), which looks at urban life in this century as a fluid, largely chaotic "culture of congestion" over which architects can assert virtually no lasting control. And who would want to? Not Koolhaas. His love of the urban condition is surpassed only by his mania for the unknown, the untenable, the unmanageable, and the untried.

Katrina Heron (kheron@wired.com) is Wired's editor at large.



From Bauhaus

What it takes to make architecture real

in the next century. By Katrina Heron

to Koolhaas



THEY WERE 40,000 STRONG.

THE CULT AT

SCIENCE FICTION WAS THEIR BIBLE.

THE END OF

THEY HAD WEAPONS OF MASS DESTRUCTION -

THE WORLD

AND THEY WANTED TO KILL THE HUMAN RACE.

This is the story of the ultimate cult: a wired, high-tech, designer-drug, billion-dollar army of New Age zealots, focused around the leadership of a blind and bearded madman, armed with weapons of mass destruction. Like scenes of an apocalyptic future in a cyber-punk novel, this story is also the stuff of nightmares.

THIS IS THE TERRIFYING STORY OF AUM.

Cultists wired electrodes to their heads while chanting ancient mantras and logging on to computer nets. Methamphetamine, LSD, and truth serum – the product of homemade laboratories equipped with the latest gear – ran through their veins. Those same labs worked at refining enough chemical and biological weapons to kill millions. Other cultists attempted to build a nuclear bomb while massive facilities were built to manufacture handguns and explosives. All this activity

BY DAVID E. KAPLAN AND ANDREW MARSHALL

went toward preparing for – and then unleashing – Armageddon.

In 1984, guru Shoko Asahara had a one-room yoga school, a handful of devotees, and a dream: world domination. A decade later, Aum Supreme Truth boasted 40,000 followers in six countries and a worldwide network that brought it state-of-the-art lasers, lab equipment, and weaponry. Aum's story moves from the dense cities of postindustrial Japan to mountain retreats where samurai once fought, and then overseas – to Manhattan and Silicon Valley, Bonn and the Australian outback, and finally to Russia. It is there, in the volatile remains of the Soviet empire, that the cult found ready suppliers of military hardware, training, and, quite possibly, a nuclear bomb.

IMAGES BY STAN GAZ

Aum leaders systematically targeted top Japanese universities, recruiting brilliant but alienated young scientists from chemistry, physics, and engineering departments. They forged relations with Japan's ruthless crime syndicates, the *yakuza*, and with veterans of the KGB and Russian and Japanese militaries. They enlisted medical doctors to dope patients and perform human experiments that belong in a horror movie.

For years this went on, with barely a question from police or the media on three continents. Before long, Aum had become one of the world's richest, most sophisticated, and most murderous religious sects. Few would know the scope of the cult's madness until Aum burst onto the world scene in March 1995 with a cold-blooded nerve gas attack in the subways of rush-hour Tokyo.

In a world poised between the Cold War and the new millennium, the tale of Aum is a mirror of our worst fears. Heavily armed militias, terrorist cells, zealous cults, and crime syndicates all find their voice in the remarkable ascent of this bizarre sect. For years, experts have warned us: the growing sophistication of these groups, combined with

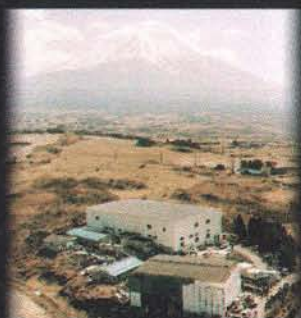
THE GROWING SOPHISTICATION OF CULTS,
COMBINED WITH THE SPREAD OF MODERN
TECHNOLOGY, COULD BRING ABOUT A NEW
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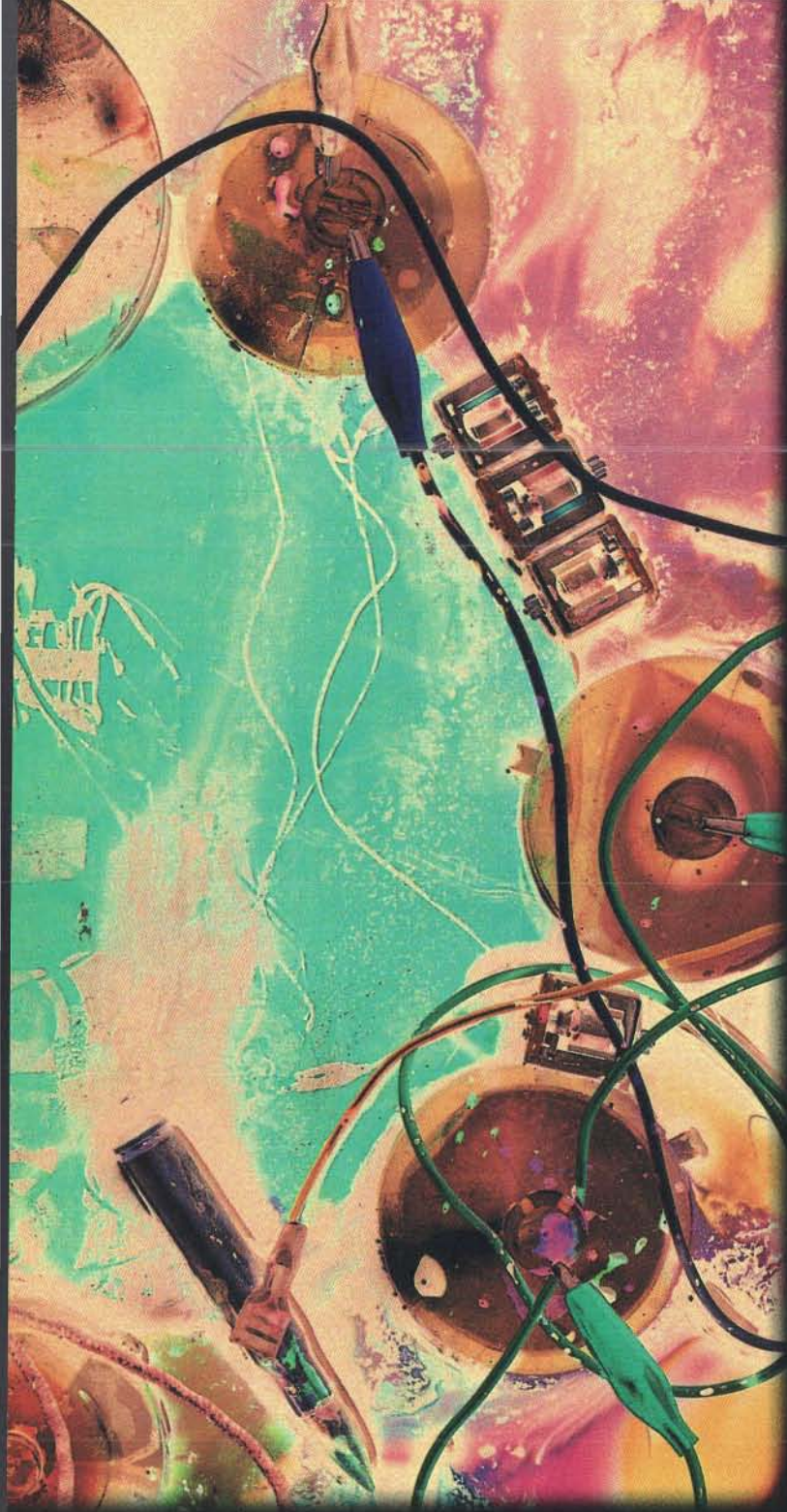
the spread of modern technology, will bring about a new era in terrorism and mass murder. The coming of Aum Supreme Truth shows just how close these nightmares have come to reality.

The story of Aum is the story of its charismatic and increasingly psychopathic leader, Shoko Asahara. The son of a dirt-poor weaver of tatami mats, Asahara attended a boarding school for the blind. There the partially sighted boy grew into a bully, dominating and scamming his classmates. Eventually, he opened an acupuncture business that specialized in quack cures, but in 1986, the ever-ambitious Asahara was traveling the Himalayas in search of enlightenment.

On descending the mountains, Asahara transformed himself into a guru, shopping the world's religions to form Aum. He blended mystical Buddhism with Hindu deities, added the physical rigor of yoga, and, from Christianity, drew on the concept of Armageddon. But Asahara

Excerpted from The Cult at the End of the World, by David E. Kaplan and Andrew Marshall. Copyright ©1995 by David E. Kaplan and Andrew Marshall. Published by Crown Publishers Inc.





the con man never lay far from the surface. The aspiring guru also began to offer an array of high-tech devices, shortcuts on the road to enlightenment for the youth of Japan. There were electrode caps, astral teleporters, magic DNA – one could give Aum credit for enterprise, at least. Unfortunately, the cult's darker side would not be limited to scamming naive kids out of their hard-earned money.

THE BEST AND BRIGHTEST

They came from college campuses, from dead-end jobs and fast-track careers. Thousands flocked to Asahara's embrace, seeking Aum's promise of enlightenment, community, and, most of all, supernatural power.

They were nearly all young, wide-eyed kids in their early and mid-20s. Some dropped out of Japan's finest schools to join the cult, leaving behind families, friends, and bright futures. Others left the nation's top companies in steel, computers, insurance, and other fields.

Asahara found the weak point in Japan's new generation and then pressed with every resource he had. In magazines, videos, and books, he took his message to the youth of his country, appealing to the lost and alienated. Aum members wrote stories and placed ads claiming they had gained powers of telepathy and levitation, offering to teach others these secret skills. Their favored publications: a booming genre of science-fact, science-fiction magazines with names like *Mu* and *Twilight Zone*.

The magazines were only part of a wave of popular culture that dealt in the far-out and the fantastic. Young people immersed themselves in a world of fantasy – movies, cartoons, computer games, comics – in violent tales of half-human, half-computer cyborgs and explosive, galactic battles fought between superbeings. All this was fertile ground for Asahara and his apocalyptic vision.

A whole generation grew up watching *anime*, brilliantly animated cartoons like *Space Battleship Yamato* and *Naushika in the Valley of the Wind*. Many graduated to the *gekiga* – ultraviolent, book-length comics drawn with realistic pictures and dramatic narratives, filled with graphic depictions of rape, murder, and a decadent, retrograde future.

Of those seeking out Aum, many were students of the sciences or technical fields like engineering. More than a few were the *otaku* – Japan's version of computer nerds – technofreaks who spent their free time logged on to electronic networks and amassing data of every type. They were invariably described as quiet kids, with little apparent interest in the outside world. They spent what free time they had absorbed in their comics and their computers.

If Japan's youth retreated into these far-out worlds, one could understand why. For many, there was nowhere else to go. They were pushed there by a culture that crushes individualism. And nowhere was 176 ►



Guru Shoko Asahara began gathering his followers in the 1980s, building a cult compound at the foot of Mount Fuji and developing trademark electrode hats. The increasingly militant group secretly stockpiled high-tech weapons in the 1990s, until unleashing a nerve gas attack on the Tokyo subway system in March 1995. Asahara is now on trial, but some cult members are still wanted.

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Keyword: TOWER

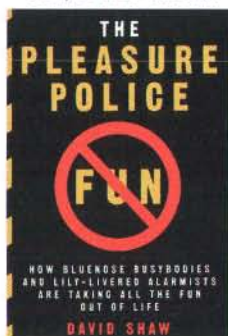
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New Wave Puritans

In *The Pleasure Police*, David Shaw, media critic for the *Los Angeles Times*, fires off a joyous libertarian rant in which he attacks the neo-Puritan culture seeking to eliminate traditional vices such as sex, dirty words, liquor, and high-calorie food.

You can make a strong case that we are safer and healthier without any of these traditional pleasures – and a lot of people do. But the result of such a politically correct, sensitive, health-conscious culture can be, as Shaw's book points out, a humorless and self-righteous environment in which we are all continuously being scolded by what he calls the "Pleasure Police."

Shaw, a Pulitzer-Prize-win-



Lily-livered alarmists.

ning critic, thinks we ought to lighten up. While acknowledging health, sexism, and other concerns, he is skeptical that some vices are as dangerous as they are made out to be, or that they need to be purged from our culture as thoroughly as they have been in recent years. Shaw's contrarian and free-spirited discussion is a valuable reminder. As for moral guardians, censors, and PC warriors, he offers these words: "May God have (some) mercy on their miserable fucking souls." – Jon Katz

The Pleasure Police: How Bluenose Busybodies and Lily-Livered Alarmists Are Taking All the Fun out of Life, by David Shaw: US\$23. Doubleday: (800) 323 9872, +1 (212) 354 6500, on the Web at www.bdd.com/.

Automatic Friend Maker

Firefly is a music and movie recommendation service that recently spun its way out of the MIT Media Lab into a Web site run by Agents Inc. The idea behind Firefly is simple: you tell the computer what music and movies you like, the computer matches up your profile with other people of similar tastes and makes recommendations on what you should buy.

Computer science geeks call this "reputation brokering," and it works pretty well in the lab. To the mix, Firefly adds interesting graphics, an overdesigned Netscape-enhanced user interface, and the option to act on the service's recommendations by typing in your credit card number and having the music delivered to your door. (The fulfillment order is done through an OpenMarket server and Newbury Comics Interactive. Albums are cheaper than retail but have a US\$4 shipping fee. Mine showed up in two days.) Firefly even asks you to rate its ads.

The underlying technology is "agents," the newest fad in artificial intelligence. Agents are autonomous software robots that go around doing their master's bidding. Firefly's agents, though, are simply a database of



The latest buzz on the Web.

preferences that are analyzed using statistical and clustering software.

The Firefly service is slow, however. On the day I tried it, the database took 30 seconds to repaint my Web page during the music-rating process. Quite a drag, considering it wanted me to rate more than 100 albums before it would give me a recommendation.

At last, Firefly made some recommendations. I like Kate Bush, The The, and Pink Floyd, so it suggested that I listen to The Beatles, The Monkees, and Spinal Tap. But when I probed deeper, I discovered that the service predicted I wouldn't like its suggested albums very much, anyway. Firefly did better picking movies, suggesting that I watch Fellini's masterpiece *8 1/2*.

Firefly offers a message box and Internet chat rooms, allowing you to electronically meet people who share your tastes. But its JavaScript crashed my Mac. I'm sure there's great technology here, but right now, Firefly just looks like an unwieldy front end to another online record store. – Simson Garfinkel

Firefly: on the Web at www.ffly.com/. Agents Inc.: +1 (617) 234 5400.



Atlas Shrugged

'90s Spin on '80s

If you remember the 1985 computer game *Ballblazer*, you're (1) probably old, and (2) definitely cool.

Ballblazer is a Commodore 64 game similar to one-on-one soccer. You pilot a futuristic hovercraft against a human or computer opponent for possession of a floating ball. *BattleSport* for the 3DO Interactive Multiplayer is a massively enhanced version of *Ballblazer*. You're still trying to score more goals than the other guy, but it's like supercharging one of Thomas Edison's protomovies with CinemaScope and THX.

The blasé hovercraft has



3DO: Out with a bang.

been replaced by an array of vehicles, each with its own weapons and capabilities. While you're scoring goals, you can temporarily blow your opponent into various planes of Hell with lasers, missiles, and homing mines. More than 50 arenas boast ramps, fake balls, rotating goals, and other game-altering tricks.

As 3DO nears the end of its life cycle, it's nice to see the system going out with a bang. — Zach Meston

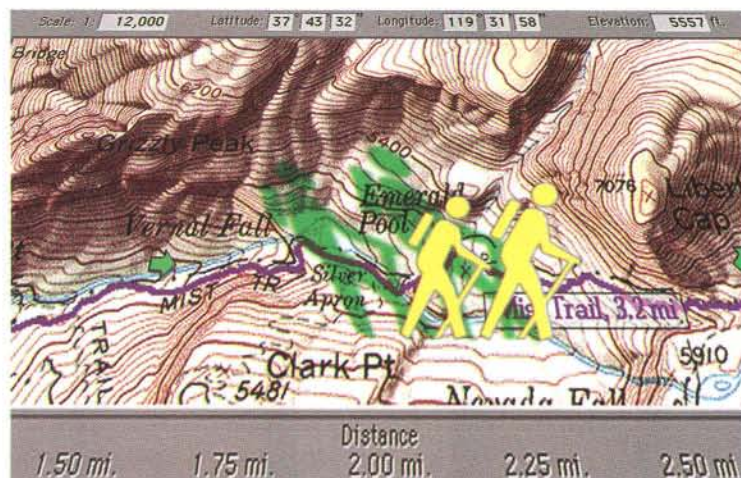
BattleSport for the 3DO Interactive Multiplayer: US\$29.99. The 3DO Company: (800) 336 3506, +1 (415) 261 3454, on the Web at www.3do.com/.

Once I came mighty close to spending a frigid night lost in the backcountry after an innocent off-road cycling spin. Finding my way out of the woods depended on a crinkled, black-and-white, grainy map that had been photocopied into oblivion by the guys at a local bike shop. Recently, I've moved into a plane of significantly higher resolution with a CD-ROM called *Topo!*

Topo!, from Wildflower Productions, ushers cartography into the 21st century with a seamless set of 50 digitized 7.5-minute US Geological Survey quad maps covering Yosemite and the San Francisco Bay area. Maps of Seattle, the Grand Canyon, Yellowstone, and Los Angeles are on the way, with even more planned to follow.

Topo! is geared to outdoor enthusiasts and anyone interested in getting a different lay of the land. Maps with crisp contour lines let you visualize three dimensions where only two exist. The customizable print function lets you zoom in or out on any area. If you printed all the disc's maps, you would get a 24-foot by 35-foot tapestry suitable for wallpaper.

Before heading on a backcountry ski tour last winter, I sat down at



Topo! turns hiking trips into 21st-century adventures.

my Mac with the disc and pored over a stretch of trails located above Yosemite Valley. I used its sophisticated browser to draw a course onscreen and created a custom point-to-point elevation profile and distance measurements incorporating elevation changes. The global perspective, minute details, and five magnification levels allowed me to know the region intimately. Maneuvering over snow-covered terrain can be a challenge, but by the time we were skiing I was so familiar with our route that I knew just what to expect.

Unfortunately, lack of a portable CD-ROM system prevented me from hauling *Topo!*'s full-color interface into the backcountry. So I packed traditional USGS quads along with customized *Topo!* maps. Printing one section and its surrounding quadrants in grayscale was a breeze. (Color is an option, but I don't own a color printer.) I also downloaded an elevation profile of the route to show my group.

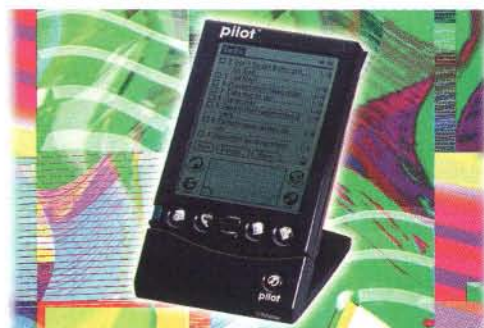
Future applications will integrate the GPS system to show a user's precise geographical position on the maps in real time. — Alex Frankel

Topo! for Mac: US\$99. Windows formats available soon. Wildflower Productions: +1 (415) 282 9112, email info@topo.com, on the Web at www.topo.com/.

Life Support

A device with no bulky keyboard, no mouse, and no user-unfriendly software is on the market. It can accept handwritten input at incredible speeds, fit in your pocket, store all vital information, and provide at-a-glance recall. It is known as a piece of paper. But if you can't get hold of this revolutionary gadget, the Pilot organizer makes a handy substitute.

Pilot is designed for people who can't go for more than 15 minutes without some item about their person bleeping, buzzing, vibrating, or playing a sound effect from *Star Trek*. It's a gadget freak's toy — not astoundingly useful, but astounding as far as it goes. It can't double as a platform for genuinely powerful applications. But if you're someone for whom "palmtop organizer" means scrawling important phone numbers on your hand, Pilot is a cheaper, US\$300 alternative to high-end PDAs.



Navigate foggy days with Pilot in your pocket.

Keeping information synchronized on a palmtop and a desktop has always required a sneaky bit of two-timing. I can never remember what one machine knows and the other doesn't and usually end up with double-booked appointments and scattered notes. But with Pilot, you simply drop the handheld unit into its "cradle," whack the HotSynch button, and Pilot's data is instantly updated with your PC. The designers obviously believe size is everything, and the lack of a keyboard is a limitation. But the Graffiti handwriting recognition is about the best in its field — hey, even I don't recognize my handwriting sometimes. Pilot is on its way to becoming a "must-have" item for gadget freaks. — D. A. Barham

Pilot connected organizer: US\$299. US Robotics Palm Computing: (800) 881 7256, +1 (415) 949 9560, fax +1 (415) 949 0147, latest info on the Web at www.usr.com/palm/.

Big Fun for Little Kids

There's little quality software for young children these days. Of the hundred-some titles behind my desk, I'd recommend maybe four, and all of those are for older children – school age or up. A new standout for the younger set is *My Make Believe Castle*, which is recommended for kids 4 to 7. No reading is required. You place animated characters into different castle scenes and change their behavior with icons. Put a ladder in front of the princess, and she'll climb up. A spring, and she'll jump forward. A banana peel, and she'll slip.

Too much educational software these days is like boot camp or a standardized



A friendly fanged fella.

test: do what you're told when you're told, and get a reward. *My Make Believe Castle* is open-ended. There are puzzles to solve – like figuring out how to use the spring to get Nicky the dragon to jump on the teeter-totter to fling the watermelon at the target. Or, you just might enjoy making the king shrink and spin like a top. This CD-ROM may not teach reading or math, but it does something even better – it encourages creativity, analytic skills, and giggling. – Amy Bruckman

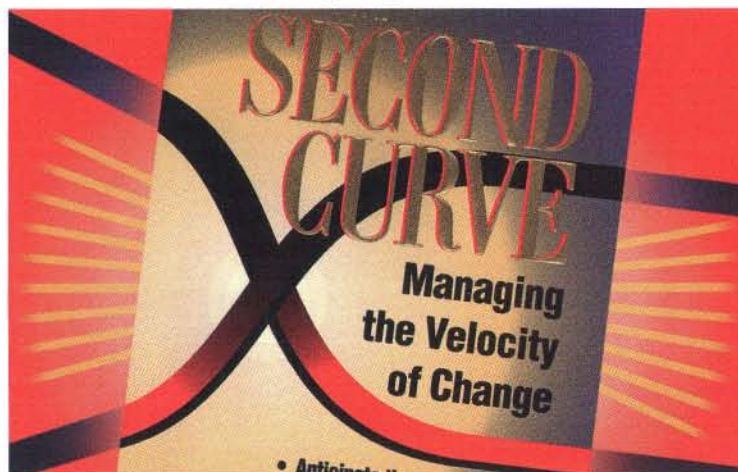
My Make Believe Castle for Mac and Windows: US\$39.95. Virtual Entertainment: (800) 301 9545, +1 (617) 449 7567, on the Web at www.virtent.com/.

Surf's Up on the Second Curve

Ever wonder what makes companies like Disney, Wal-Mart, and Virgin cool and successful? In *The Second Curve*, Ian Morrison says it's because they're riding the "second curve" while laggards like Sony, K-Mart, and Air France are still stuck on the first.

Forget Alvin Toffler's waves. Morrison's curves aren't about society, but phases in a company, industry, or technology life cycle. Most follow a classic bell curve. This is the fat, comfortable space where most income and profit come from now. By finding a second curve, you're in position to ride it up as the first one peters out. The second curve is where business and the marketplace are going. It can be a new line or way of doing business that will propel your company on a growth plan to the stars. Managing this change is the only way not to become a dinosaur.

Ian Morrison is president of the Institute for the Future, a Menlo Park, California-based think tank. Big companies pay him to think about the future and how it could affect their businesses. His book draws on that experience to plot a course for jumping on the next big thing. Along the way, he looks at why some products (like videophones and personal helicopters) are always the next big thing and never seem to become the *current* big thing.



Why Disney and Virgin are blazing new trails while Sony lags behind.

There's no crystal ball in Morrison's bag of tricks. He writes more about current trends than the future. His technique is to look at emerging changes and extrapolate them, leaving plenty of room for the unexpected.

For example, consumers are getting picky, demanding, and smart. So retailers had better plan their new ventures accordingly. Personal finance is moving toward nonbank "banks" like Visa, Charles Schwab, and Intuit. Therefore, real banks had better change or figure out a way to die gracefully on that first curve.

Morrison occasionally writes like someone who's been with a think tank too long: "Air France ... has experienced a decelerating rate of growth and negative increase in net income." I think he means that growth has slowed and income has dropped. This kind of circumlocution is the exception, however. Most of the case studies are cogently expressed and illustrate his points well.

There's no guarantee that reading this book will keep your company from being relegated to the dustbin of history, but if it is, at least you'll understand why. – Jeffrey Mann

The Second Curve: Managing the Velocity of Change, by Ian Morrison: US\$25. Ballantine Books/Random House: (800) 733 3000, +1 (410) 848 1900, on the Web at www.randomhouse.com/.

12 Monkeys 1.0

In 1962, long before Terry Gilliam's *12 Monkeys*, Chris Marker created *La Jetée*, a remarkable short film about romance and postapocalyptic time travel. But unlike the hyperkinetic and color-saturated vision that followed in its footsteps, *La Jetée* is a testament to the power and beauty of minimalism.

There are no special effects in *La Jetée*: the entire story is told through a series of simple black-and-white photos accompanied by a male narrator. In an age when MTV and Hollywood action flicks routinely barrage viewers with 10 cuts per second, the dramatic power of stillness and a single voice has never been more pronounced.

While the film isn't likely to show up on late-night TV anytime soon, you can get a further sense of *La Jetée*'s power in the photo-book version of the film from Zone Press publishers. Probably no other movie has ever been so suited for translation into print. Each two-page spread of *La Jetée: ciné-roman*



Seeing stars on *La Jetée*.

contains still images from the film and the text of the narration in both French and English. Here you really can see Marker's exquisite techniques and the subtle character interactions. Zone Books has done a superb job of preserving the sense of fragmentation, fragility, and stark visual beauty that has made *La Jetée* a classic.

Thirty years after the film was made, we're not quite so consumed by fear and nightmare visions of a nuclear Armageddon. But the threat of annihilation still lurks in the back of our collective psyche – as does AIDS, terrorism, the fear of displacement by machines, and anxieties about losing our history and humanity. *La Jetée* isn't just another save-the-world scenario. It's a story of how love and eros can change everything. – Richard Kadrey

La Jetée: US\$19.95. Facets Video: (800) 331 6197, +1 (312) 281 9075. *La Jetée: ciné-roman*, by Chris Marker: US\$26.50. Zone Books, distributed by MIT Press: (800) 356 0343, +1 (617) 253 5641, fax +1 (617) 625 6660.

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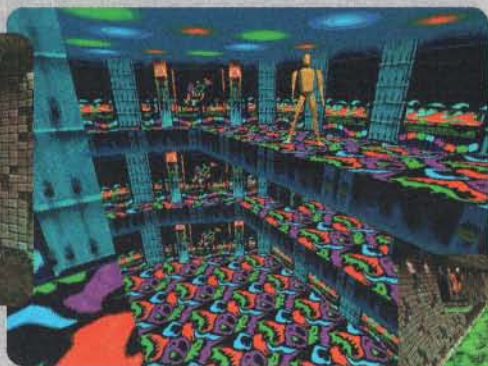
Release: Late Summer

100 PERCENT PURE ADRENALINE

Adaptations of books are almost always doomed to failure. Odds are 10-to-1 you walk away thinking the novel was better left unadulterated. However, there are exceptions. Neal Stephenson's *Snow Crash* may be one of them.

In this best-selling sci-fi thriller, Stephenson describes a future in which computer hackers have created an online world called "the Metaverse" and must battle the deadly Snow Crash virus. (Stephenson himself originally visualized *Snow Crash* as a graphic novel, but you may have to wait a while longer for that.)

In late summer Viacom New Media will release *Snow Crash*, the CD-ROM action-adventure game that takes place in the Metaverse. The disc features four possible endings and more than 30 missions – 10 of which are hidden or secret. As you stomp your way through this virtual world, you're forced to make choices



that will either spread or stop the virus. But not every aspect of the game has a purpose – according to producer Jake Smith, the game features "kill zones" (just like the book) in which the idea is simply to "thrash everyone else. There's really no purpose to this part, just pure fun."

Smith says Viacom attempted to retain the book's flavor by keeping core elements of the Metaverse – such as the Black Sun, a virtual bar and club. The soundtrack will be a kind of "industrial pop," he says, "somewhat like early Ministry." Personal taste will determine whether or not you see this as an improvement on the speed metal that Stephenson used as a soundtrack while writing the novel. – Kristin Lowe

Viacom New Media: +1 (212) 258 6000, on the Web at www.viacomnewmedia.com/.



Release: Late June On the heels of the release of *Final Doom*, the last of the series, Logitech offers WingMan Warrior, a two-handed joystick with a supplementary 360-degree spinner knob designed for fast-action, *Doom*-style, computer-generated butt-kicking. Logitech Inc.: +1 (510) 795 8500, www.logitech.com/.

Release: July If Sega's sights on playstations and networked gaming weren't enough, now it's got a bead on the lucrative PC CD-ROM market. *Sonic PC* makes its debut along with *Bug!* this month, injecting a little more action into the PC arcade-action category. Sega Entertainment Inc.: +1 (415) 508 2800, www.sega.com/.



Release: July Seems "new media" doesn't just mean the Web. As Ziff-Davis's ZDTV pops up on developer and co-producer MSNBC's cable channel, the paradigm shifts. ZDTV, an hour-long Internet show, airs weekdays, and like its forebears – cnet and PCTV – it aims for media synergy with a companion Web site. It's becoming clear that for splash, you do TV; for hype, you do Web. Combine them, and you may just make money. Ziff-Davis: +1 (415) 243 3610, email zdtvhome@zd.com.



JUST OUTTA BETA

Release: July In the ultracompetitive CD-ROM gaming market, it's difficult to leave well enough alone. While the ambitious *Voyeur* made a splash three years ago, can *Voyeur II* leave as great a mark? One can hope. Philips Media Inc.: +1 (310) 444 6500.



Release: July By the looks of its pre-press response, Rafael Carter's book, *The Fortunate Fall*, should be a solid SF hit. It's a tale of love and betrayal in the virtual realm with a dense historical backdrop. Tor Books: +1 (212) 388 0100. To order: (800) 288 2131.

Release: Summer The kids are all right ... now that they're banging away on the Wonder Tools Keyboard from Compaq and Fisher-Price. It offers oversized keys and a finger mouse – just what the little ones need for their trips on the digital plane. Compaq: (800) 345 1518, +1 (713) 370 0670.



Release: Summer Aerosmith's gone Siliwood with – Robert De Niro? It's true. 9, Tribeca Interactive's first interactive CD-ROM, features the voices of Steven Tyler, Joe Perry, James Belushi, and Cher. Painter Mark Ryden fashioned the distinctive look of this adventure in an old resort hotel. GT Interactive: +1 (212) 726 6500, www.gtinteractive.com/.





Elliot Goldenthal

Fire Water Paper: A Vietnam Oratorio
Pacific Symphony Orchestra
Sony Classical

Access Code 1285

Two decades after its formal conclusion, the Vietnam War remains an American stigma whose knotted history participants still struggle to unsnarl. Elliot Goldenthal's three-movement oratorio attempts — much like the Vietnam Veterans Memorial — to create an artistic work that helps the public confront its feelings about the war. It succeeds. With an expanded orchestra and paired choruses, director Carl St. Clair gives voice to Goldenthal's lament.

Colliding Catholic and Buddhist liturgies, contemporary poetry, and a Jimi Hendrix guitar riff, Goldenthal's percussion- and brass-heavy work appeals to a broad audience. Its opening, "Offertorium," builds upon instrumental rounds to discordant climaxes, deafening clashes of metal-beating percussion and blaring brass; the "Scherzo" pits polyrhythmic trum-



pets against trilingual chants — a 17-count exercise executed with military precision. "Hymn" closes with prayerful imagery and guarded optimism, a children's chorus singing its final, sustained notes. Throughout, soloists Ann Panagoulas and James Maddalena perform with exceptional strength; Yo-Yo Ma likewise delivers a fine performance, coaxing angry slashes and tender weeping from his cello.

What lingers, however, is Goldenthal's musical juxtapositions within the composition: oboe and solo baritone combine divergent timbres in the first movement; seesaw strings jar the woodwinds' graceful melody in the second. Choral voices paired with staccato percussion evoke shrapnel piercings, and simultaneous major-minor chords undermine any nationalistic, good-versus-evil metaphors.

"All wars are civil wars," sings the chorus at midpoint, "always man against man." With *Fire Water Paper*, Goldenthal begins to address these contradictions, to loosen the still-tangled knots of America's Vietnam legacy. — Colin Berry

Astor Piazzolla

57 Minutos con la Realidad
Intuition Music

Access Code 1286

Like Igor Stravinsky, Duke Ellington, and Bob Marley, Astor Piazzolla took an extant musical genre — the tango — and completely transformed and reinvented it, eventually becoming its greatest exponent. This recording features the composer on bandoneon, the large-button concertina that figures so prominently in the Latin dance's tradition. The CD's interplay of guitar, cello, piano, and bass with the swooning bandoneon is intoxicating. Whether it's the passion of the live performances, the revitalized sextet, or the tango's timeless allure, this stunning recording is pure magic. — Dean Suzuki



Manfred Hübler and Siegfried Schwab

Vampiros Lesbos
Sexadelic Dance Party
Motel

Access Code 1290

Drag out your thigh-high, stiletto-heeled, patent-leather fuck-me boots and strap on your wrought-iron trivet bra — this 14-song collection of Jess Franco's schlock-film soundtracks combines Nancy Sinatra and Bela Lugosi with Russ Meyer's fleshy fetishes and handfuls of LSD. Devilish diva Soledad Miranda leads the dark parade of sex-hungry vampires who gyrate to martini-sipping go-go sounds for which the Pizzicato Five can only pine. Fangs and fake nails optional. — Todd Perley

Porno for Pyros

Good God's Urge
Warner

Access Code 1287

Though far more developed than its crude debut, *Porno for Pyros*' sophomore project finds the band still not living up to its potential. Singer Perry Farrell isn't his shamanistic, effervescent self, and the others seem rather detached and lethargic. Guitars, bass, and drums are incidental — almost absent — mellowing the vibe to an awkward place where the music is too aggressive for introspective chillin', yet not assertive enough to catch flame. Sorry, guys: *Good God's Urge* is flabby around the middle, and not even fiery guitars and energetic songs late in the disc can save it. — Paul Semel



Soul Coughing

Irresistible Bliss
Slash

Access Code 1291

Soul Coughing's second release boasts full-fledged funk as well as an instinctive and uncompromising command of varying musical modes. The New York foursome fuse spacious sampling and brisk rhythms with whimsical, melodic rants — a healthy confusion of fusion that's sure to spur body-slaming and knee-slapping. *Irresistible Bliss*'s unflagging groove roars, as usual, above thick liquid vocals, propelling us into a lucid lull. Navigate their syncopated musical maze: Soul Coughing don't just smoke — they blaze.

— Allison Diamond

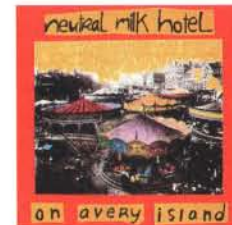
Neutral Milk Hotel

On Avery Island
Merge

Access Code 1288

Dingy penny arcades and ice cream trucks with exhaust leaks provide recurrent motifs on *Avery Island*, a place where perpetual childhood isn't such a cheery proposition. Rural Louisiana native Jeff Mangum favors fuzz-tone guitar effects and overtaxed Casios, creating shut-in show tunes that owe as much to Ray Davies's recent, twice-removed vaudeville act as they do current standard-bearers of lo-fi. Mangum offsets often-chilling vignettes with elemental melodies and the comedic interruptions of a slurring trombone, making his debut of remarkable depth.

— James Sullivan



Akendengue

Maladité
Melodie/France

Access Code 1292

Pierre Akendengue, Gabon's top singer and composer, is known for mixing traditional rhythms with popular dance music. In 1994, Akendengue produced *Lambarena*, a tribute to Albert Schweitzer that featured the music of J. S. Bach played by Gabonese singers and drummers sitting in with a Baroque chamber ensemble. Like *Lambarena*, *Maladité* is a timeless Afro-European excursion full of unforgettable melodies that balance pinwheeling Afro-baroque vocals and hardcore African drumming with deeply funky dance beats.

— j. poet

DJ Krush

Meiso
ffrr/Mo' Wax

Access Code 1289

Rappers have long shouted "break it down!" but DJ Krush takes the adage to the limit, deconstructing his genre to its essence with hypnotic breakbeats and jazzy minimalist sounds. A Japanese B-boy weaned on American rap, this leader of the "beat-head" movement has always milked culture clashes for artistic juice: *Meiso* pits street hip hop against avant-garde, linking songs featuring guest rappers (Guru and Roots' Malik B) with enigmatic intermissions called "bypaths." These freestyles are mere distraction, though — it's the DJ's needlework that really gets under your skin. — Sia Michel



Plunge

Falling with Grace
Accurate

Access Code 1293

I've always loved the *blat!* of low-end horns, and this trombone- and tuba-driven avant-jazz quartet can wail. From funk to New Orleans jazz to pensive ballads, Plunge — Mark McGrain, Marcus Rojas, drummer/percussionist Bob Moses, and double-bassist Avishai Cohen — delivers a sonic feast with all the fixings. Fast tunes are eminently danceable, tracks so hot their grooves stick in your head hours later; slower tunes are similarly tasty, just a little more ruminative. Check out Plunge's honkin' horn harmonies and slappin' 'n' poppin' tuba!

— Peter L. Herb

Microwave o' the Month



Warrant

Best of Warrant

Legacy

And here I thought they'd finally compiled all those 10-second silences between songs. Sneaky little bastards – I'll never trust a CD title again. – *Colin Berry* •

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Code Artist and Title

- 1285** Elliot Goldenthal, *Fire Water Paper:*
A Vietnam Oratorio
- 1286** Astor Piazzolla, *57 Minutos con la Realidad*
- 1287** Porno for Pyros, *Good God's Urge*
- 1288** Neutral Milk Hotel, *On Avery Island*
- 1289** DJ Krush, *Meiso*
- 1290** Manfred Hübner and Siegfried Schwab,
Vampyros Lesbos Sexadelic Dance Party
- 1291** Soul Coughing, *Irresistible Bliss*
- 1292** Akendengue, *Maladité*
- 1293** Plunge, *Falling with Grace*

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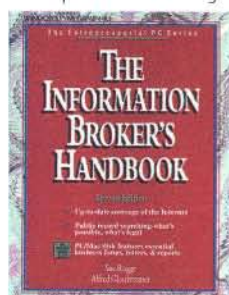
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Fast Fact Finder

Information wants to be free, right? I thought this meant the Net would be a gold mine of information, where I could skim nuggets off the top. I wish I'd had *The Information Broker's Handbook* when I first got on the Net – I would have saved myself from wasting time in almost the right place, or flooding myself with 30,000 hits from a Web search site – of which I found only three worth a damn.

The Information Broker's Handbook is an enjoyable crash course in getting choice info tidbits anywhere they can be found, online or in print. It will also teach you about information brokers – those specialists in knowing



Better than Yahoo!

where the facts are and how to get them for their clients.

This book covers valuable Net resources, such as Hoover's *Handbook of American Business* (www.hoovers.com/). It also forced me to face the fact that tons of essential business and academic information is still available only in books. And a fair amount is tied up in proprietary databases.

The handbook's lists of various resources and what they are used for is worth the price of the book.

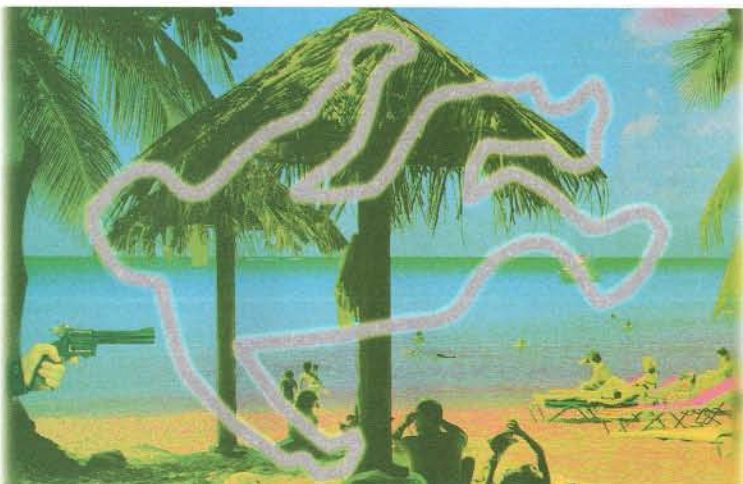
—Elizabeth Lewis

The Information Broker's Handbook, by Sue Ruggie and Alfred Glossbrenner: US\$34.95. McGraw-Hill: (800) 722 4726, +1 (212) 512 7972, on the Web at www.mcgraw-hill.com/.

Tropical Island Intrigue

Most online multiplayer games have not tread far beyond the fantasy role-playing genre. But *Modus Operandi* is not your typical online game: it relies more on Dashiell Hammett and James M. Cain than Gary Gygax or Frank Frazzetta. There are no scantily clad magic users named Ursula, Queen of the Half-Elves. There are no dungeons to explore, no treasure to be found.

Instead, *Modus Operandi* players must rely on their wits and deductive reasoning to get ahead. Available on America Online, Prodigy, and Genie, the text-based, multiplayer game is set on the fictional island of Morada, a place full of shady characters and tropical corruption. After creating a character to inhabit (selecting height, hair and eye color, age, name) and assuming an occupation (ranging from retired cop to paranormal investigator), players wander around the vast island, solving various crimes as they occur. Luckily, the incident rate is sky high. In my first few hours, I had exorcised a church, returned



Join the magical mystery tour.

a stolen ancient Bible to the local library, and even hunted down a few of Morada's most wanted criminal minds.

Developed by Simutronics (creators of the online hit *GemStone*), *Modus Operandi* creates a highly detailed fantasy world. There are hundreds of buildings to explore, dozens of crimes to solve, and plenty of social activity. What's more, the island keeps expanding, with new areas to flesh out, new characters – both real and computer-generated – to speak with, and new features to add to the atmosphere. If you're in need of a clue, computer-generated characters can help. You can chat with human players and team up for creative crime-solving.

When you get tired of busting bad guys, there's always a party going on in the Balmour House Hotel or high-stakes gambling at the Pirate's Casino. If you visit the casino, be sure and stop by the craps table and say Hello to Hank. —Ron Dulin

Modus Operandi: free on AOL, Prodigy, and Genie; Keyword: modus. Simutronics Corp.: email modusmgr@aol.com, on the Web at pathfinder.com/twep/games/modop/.

Exiles with Designs on America

Twenty Austrian architects who settled in the US at the turn of the century radically altered our thinking about architecture. Their little-known but impressive story is powerfully told on *Visionaries in Exile*, a CD-ROM by Austria-based Science Wonder Productions.

Pop the disc into your drive and you're presented with photographic portraits of several severe-looking Austrian architects from another age. Clicking their heads yields fascinating yarns exploring the evolution of their thinking about design and how buildings impact human behavior.

I have to admit I never gave much thought to who invented the shopping center. But discovering builder and theoretician Victor Gruen's role four decades ago in creating this architectural genre was eye-opening. *Visionaries in Exile* offers Gruen's original shopping center blueprints plus the text of his manifesto "Shopping," which connects the typical housewife's need for shopping to "spiritual hunger."

Perhaps the most radical thinker here is Bernard Rudofsky, a dabbler in fashion as well as an architect



How buildings build humans.

profoundly influenced by traditional Japanese arts. Radical doesn't mean humorless: Rudofsky's Museum of Modern Art show of a half century ago, *Are Clothes Modern?*, included a symmetrical woman's shoe, designed for a perfectly symmetrical foot.

This disc gave me a strong sense of just how playfully imaginative these Austrian architects became when their fantasies were kick started by hefty infusions of American money and technology. It's a rich historical irony that the most whimsical designs created by these left-wing Austrian professors were later built by conservative businesses to serve as headquarters for corporate America.

Visionaries has a few bothersome shortcomings. Blueprints and drawings are reproduced without much sharpness or detail. The biographies of the architects are long on personal trivia and short on moments of creativity. But for anyone who has ever questioned how American architecture developed, this program offers a pantheon of giants who altered New World landscapes with Old World finesse. —Norman Weinstein

Visionaries in Exile, CD-ROM for Mac and PC: US\$49.95. Organa: +1 (212) 233 5161, fax +1 (212) 233 5160, on the Web at www.organa.com/.

Bozo Filter

Notebook computers are a peeper's delight: they allow the guy in the next airline seat to read your confidential spreadsheet and your co-workers to realize you're writing a novel rather than taking notes.

I just tried two products that fix the problem: the Spectrum Secure-View security filter, from Kantek, and GlareGuard's Traveler 2000. Both work by blurring and darkening the screen for off-axis viewers; Spectrum's darker screen is slightly more effective.

Spectrum is smaller and lighter: it fits up to a 10 1/2-inch screen, while Traveler fits up to an 11-inch screen. Spectrum attaches with four hook-and-loop fasteners, while the Traveler's swing-up frame clamps onto your screen. The



For your eyes only.

frame clamps take up more space, but they also make it easier to transfer the filter to another computer. Both screens claim to enhance contrast – Spectrum says it prevents glare – but I found this wasn't the case, and both were more reflective than my Compaq's real screen. So don't expect either of them to work well outdoors.

Neither screen disguises solitaire enough to make it look like a sober text – but both will keep your seatmate from kibitzing. – Ivan Berger

Spectrum Secure-View for notebooks: US\$89.99. Kantek Inc.: (800) 536 3212, +1 (516) 593 3212, on the Web at www.business1.com/Kantek/. Traveler 2000: US\$69.99. GlareGuard: (800) 545 6254, +1 (707) 525 7669.

READ ME On the bookshelves of the digerati

ROGER EBERT *spews about movies on television (Siskel & Ebert) and on CompuServe (go: Ebert). Here he spews about reading....*

The Leopard, by Giuseppe di Lampedusa. "The novel I enjoyed the most in the last five years. Within a few pages, the protagonist became a distinctive, valuable, fascinating person, whose love for life and the traditions of his society drenched every page."

A House for Mr. Biswas, by V. S. Naipaul. "It gives us the whole sweep of a man's life, in which he achieves great things but never feels fulfilled or satisfied. I had the sense that Mr. Biswas was heavily based on Naipaul's father. And the character reminded me of mine. I read it immediately after *The Leopard*, and was interested in the ways that two such seemingly different characters shared the same values."

STEVE SPEER *creates digital animations and 3-D virtual worlds, which he hopes will alter our perceptions "just as magic rituals did in the past."*

"I'm doing heavy research on Nikola Tesla. He and Mark Twain were good friends, so I started reading Twain, and Twain led me to James Joyce. I had always known that I would read *Finnegans Wake*, after reading so much Celtic mythology, but I kept circling it. When I found out that he was such a fan of *Adventures of Huckleberry Finn* – that was my entry point. Since then I've been wading through lots of criticism like *A Skeleton Key to Finnegans Wake*, by Joseph Campbell. It's not the kind of thing you read, it's the kind of thing you absorb. I've been bumping it off other things. Searching for clues about life. I don't read anything



Roger Ebert



Steve Speer



Rand Miller

that's fluff. It's all something that I can learn from. I read fiction by authors who put a subtext into their creation, who embed their world-view and philosophy into the works. That's what I find so cool about Joyce – his stuff is so embedded.

The Gnostic Religion: The Message of the Alien God and the Beginnings of Christianity, by Hans Jonas. "This is a great book on the idea of man as a spark of God imprisoned on this planet in rotting flesh. It's about immediate experience. About being shocked into waking up. About dissolving and coagulating. I want urgency. I want to explode my brain as much as possible."

RAND MILLER, the older brother of the *Myst* team, lives in the foothills of Mount Spokane, Washington, where he's busy creating their next CD-ROM masterpiece.

Dancing Wu Li Masters: An Overview of the New Physics, by Gary Zukav. "Given my belief in a creator and my longing to create, I've got this burning desire to understand more of how creation works. This book discusses quantum physics and relativity at a college dropout level. It is full of great facts and bizarre truths about the universe. How do quantum physics, consciousness, and creation tie together? Don't get me started!"

The Pencil, by Henry Petroski. "This book, in spite of its rather thick width, is simply about – surprise – the pencil. I never realized all of the discoveries and events leading up to the Number 2. It was also interesting to learn that the development stopped at some point – the wooden pencil as we know it is just about as good as a wooden pencil gets! Ironically, though, I use a Newton."

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TM 007

1. Biometrics

From fingerprint identification to retina scans, biometric security devices have had a tough time making the transition from sci-fi movies to real life. But pointing to the security problems that plague the Net, companies are developing new biometric devices that plug into PCs so users can prove their identity. Injecting some physical reality into the virtual world sounds appealing, but don't hold your breath. Biometric devices are more expensive than smartcards, which provide almost as much security and are far more flexible. Besides, with smartcards you don't have to worry about Hollywood-style finger amputations.

2. Web Appliances

Finally realizing that the Web won't become the next TV, analysts are now predicting that it will become the next remote control. The theory is that everything – from your home alarm system to your dishwasher – will soon be on the Web, where they can communicate with each other and provide intuitive, programmable interfaces. Based on the smattering of Coke machines and hot tubs already hooked up to the Web, we can make some predictions about how this will work out: appliances will become a lot harder to use, and they will usually be down.

This Month's Overhyped Memes	Hype Level	Position Last Month	Expected Lifetime
Biometrics	🔥	0	6 months
Web Appliances	🔥	0	6 months
Methamphetamine	🔥	0	6 months
Intranets	🔥	0	3 months
Moore's Second Law	🔥	0	9 months

0 = Embryonic meme 🔥 = Meme on the rise 📰 = Mass-media meme ☠️ = About to die from overexposure



3. Methamphetamine

Experts have been predicting for years that synthetic, easy-to-manufacture drugs like MDMA and fentanyl would someday displace old-fashioned, organic drugs that have to be harvested. Well, based on the recent hype decrying speed as the scourge of the nation, it looks like technology's war against nature has won in another venue. It's too bad the nation's kitchen-chemists had to pick something as uninspiring as meth, but perhaps, given technology's fondness for rapid product cycles, we'll soon see MK-801 and other, more esoteric alternatives.

4. Intranets

There is a clever kind of shell game going on in MIS departments right now. With some quick sleight-of-hand, client/server solutions are disappearing and centralized mainframe systems are coming back. Except, this time they're called "intranets." Client/server proved too difficult and too expensive. With the intranet, you're back to the good old days of dumb terminals and central databases. Just plug that dusty IBM mainframe back in, call it a Web server, and go!

5. Moore's Second Law

Whenever a slowdown hits the semiconductor industry, the press is quick to predict apocalypse. This time, they've seized on Moore's Second Law, which predicts that the capital investment required to build each new generation of chips will increase until no company can afford to build a new chip fab. Even if the law is true, it may be for the best. Instead of relying on increases in the number of transistors per chip, engineers will have to come up with smarter ways to use the transistors. The result may be revolutionary progress, instead of evolutionary.

– Steve G. Steinberg (hype-list@wired.com)

Bow Your Horn

You're in the recording studio working on a track. It's shaping up nicely but cries out for a sound. Something like – a 12-inch cello with a saxophone mouthpiece. Ideal! But where to find it at 3 a.m.?

Until recently, the answer would have been "In your dreams, pal." But that was before Yamaha brought out its revolutionary VL synthesizers, which allow such instrumental flights of fancy to be modeled and played by a keyboard or MIDI controller.

Sounds great, doesn't it? Unfortunately, given the choice between developing innovative technology and having their teeth drilled, the average musician will open wide and say "Aaaah."

But help is at hand, with a visual editing freeware



Instruments of fancy.

package from the Yamaha Web site. Now programming the VL is not only breathtakingly simple, but almost as much fun as playing it. On the first page you create the foundation for the new instrument by pairing one of the various pipes/strings with a method of using it acoustically (blowing, bowing, plucking). Thus the "bowed flute" and "blown string" become a reality. You can refine the instrument by manipulating chunky plug-in modules, changing resonances, and adding pickups or filtering. It's amazing just how quickly a commonplace plucked clarinet can become a snarling techno-piranha-bass. – James Doherty

Yamaha VL Visual Editor freeware for Mac. Yamaha Corp.: +1 (714) 522 9011, on the Web at www.yamaha.com/.

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Norman Weinstein reviews music for *Wired*, *Pulse!*, and *Monitor Radio* on NPR. He is writing a book about the physics and metaphysics of light in Frederic Church's paintings.

Have something you'd like to review for Street Cred?
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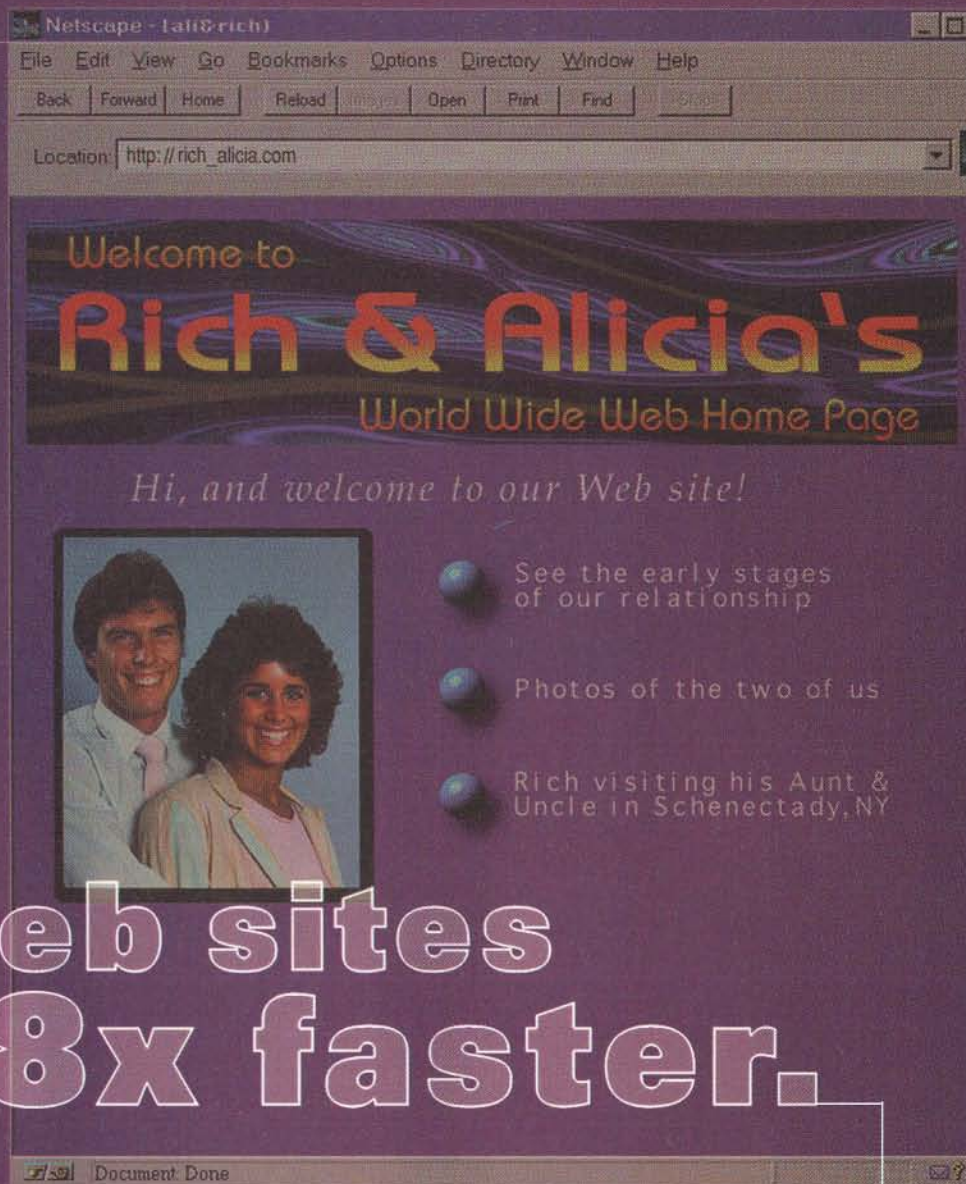
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Breaking with Convention: Political Wonkery on the Web

Call me a wonkhead, but I love presidential politics. In 1992, I finally got press passes for two hot July nights at the Democratic National Convention. Best show I'd seen at Madison Square Garden since *The Who* in '79. Not because I'm particularly partisan. It was the celebrity frenzy that got me juiced. Camera in hand, I staked out close-ups in the crowd – Larry King to my left, Timothy Hutton to my right, even a shot of Buck Henry with his arm around me. I got a wicked body check from Maria Shriver as she thrust a giant penis of a microphone into the face of some poor superdelegate. The best was when two bodyguards escorted Jackie O. right past my lens. "Save that photo," a relative of mine later told me. "You were the last person in the family to see her alive."

This time around, I probably won't get a chance to mingle in San Diego or Chicago. But that's OK – the Web's here now. At last count, the Alta Vista search engine turned up a few hundred sites that contained the keywords "presidential campaign." Most of them are real dogs, of course, appealing only to those who harbor a fetish for propaganda pamphlets.

The true political junkie will want to visit *PoliticsUSA* (politicsusa.com/), a site run by the National Journal and the American Political Network – an Alexandria, Virginia-based publishing company that's been compiling the inside poop on campaigns since 1988. (See "Ad Nauseam," *Wired* 4.05, page 67.) My favorite feature is the continually updated, color-coded electoral college map. The folks who run this site collect poll data from local media outlets and universities in each state to produce a running tally of which electoral votes are solidly and narrowly in the Dole or Clinton column. In one glance, all the endless online analysis and spinmeistering is rendered superfluous.

For a fascinating diversion, check out the Web sites run by the third, fringe, and nonparties that are becoming increasingly important in the patchwork quilt of '90s politics. The *Christian Coalition* site is brilliant, if only for the brevity of its URL (www.cc.org/). My personal pick is the site run by the *Reform Party* (www.reformparty.com/), which is waging a yeoman's effort to get on the ballot in all 50 states. Before I paid a visit, I had no idea this group had a set of guiding principles that all its members allegedly hold dear. These mandates seem to consist of half-baked, homespun remedies for things like the budget deficit ("The Tax System Must Be Paperless") and the corrupt culture of Washington ("No More Free Meals"). It doesn't say who exactly came up with these sacred principles, but I could wager a pretty good guess.

A surprisingly interesting site comes from the New York software company Crossover Technologies and the nonprofit Markle Foundation. Its *President '96 election simulation game* (www.pres96.com/) is centered around 10 fictional candidates who bear a striking resemblance to real-life politicians. (A Senator William Dickey stars in the Dole-like role.) Players act as supporters who decide on which side of the issues their chosen candidate comes down. The entire 1996 election process has a parallel universe here – only it's more suspenseful. "No one will likely clinch the nomination before the conventions," says Crossover president Eric Goldberg. The game uses a strictly proportional delegate system, as opposed to the winner-take-all rules of many real state primaries. With sites like these, the Web may be the one place in American politics in which fiction is once again stranger than truth. As it should be.

– Evan I. Schwartz (evan@cis.compuserve.com)



Getting Malled

The difference between the average cyber-mall and the *Violet boutique* (violet.com/) is like the difference between pink liquid gas-station soap and creamy, French-milled bars that smell of pears and buttermilk. Designed with the sparse luxury of a *Comme des Garçons* shop, Violet is the spa of online retail: high-end, high touch. Catalog junkies: Enter at your own risk.

A Bohemia of the Mind

Bust out the bongos and light up a cig – it's time to dig the beat generation! The *Literary*



Kicks page is a beautifully assembled shrine dedicated to all people, places, and things beat. Lit Kicks will give you the complete low-down on the life, work, and travels of Ginsberg, Ferlinghetti,

Cassady, Corso, and a host of other hep cats. You'll also find rare photos, original fiction, and extensive lists of beat references in music, movies, and modern culture. Or, you can dig the starry dynamo of the night, listening to Kerouac recite selections from his novels and poems. Hop aboard the Nova Express and ride that train to www.charm.net/~brooklyn/LitKicks.html.

Big Is Beautiful

You've spotted it at 20 paces. You've seen it frighten small children. You've yearned for some of your own. Pine no more: big hair is here! The panacea for those of us doomed to dismal dos, *Texas Hair and Style* provides step-by-step instruction on how to make your hair huge. There are tips on teasing and spraying as well as pictures to prove that hair in Texas is as big as it gets. Links unveil such magical techniques as prevolumizing and back-combing. If the technical gymnastics of it all seems a bit overwhelming, you can see yourself Texas-style by simply taking big hair GIFs and pasting them onto your own image. Witness the spectacle at www.dallas.net/~styletx/home.html, and make it your own.



Bacon: The Other White Meat

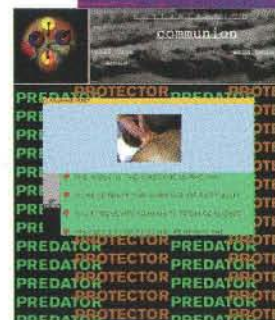
If you've ever played the Kevin Bacon game, you know that something very frightening is happening. The challenge: link any actor to our footloose friend within five steps. For example, try Debra Winger. She was in *Terms of Endearment* with Jack Nicholson, who was in *A Few Good Men* ... with Kevin Bacon. Easy, see?

The more you play this game, the more you realize just how eerie it is. But now, some good people at the University of Virginia have taken this parlor game to an entirely different level by creating *The Oracle of Bacon at Virginia* (www.cs.virginia.edu/~bct7m/bacon.html). By running a massive database through their mainframe, they have proved the Law of Bacon. According to their calculations, no actor has a BF (Bacon Factor) higher than 5. And the law doesn't just apply to contemporary actors: I had successful hits with Humphrey Bogart, Bela Lugosi, and Greta Garbo.

Inform philosophers and film theorists immediately! Organize task forces! The Oracle has spoken – this can't be good news for civilization.

Cleaning Up the Web

Let's face it: cyberspace, despite its egalitarian pretenses, is still very much a man's world. Enter *Brillo*, a hard-hitting online zine challenging the patriarchy that reigns supreme on the Net. A lively mix of interviews, essays, and rants, *Brillo* kicks down the doors of the electronic boy's club, giving voice to women and people of color. More than just an online soapbox, the publication offers practical tools and information to empower people online and off. The premier issue, "Armed and Dangerous," features an interview with an instructor at Plugged In, a community training center that helps low-income families leverage new technologies. Also noteworthy is a talk with the Barbie Liberation Organization – those wacky social guerrillas who made headlines by switching the voice boxes in hundreds of talking Barbies and G.I. Joes a few years back. Set your browser to www.virago-net.com/brillo/ and find out why a woman's place is on the Web!

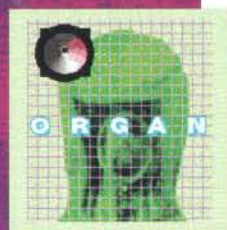


Funnel is an arresting collection of moving images and sound brought to you by the wetware of artist Erik Adigard and the software of Shockwave. Swirl into the maelstrom at www.funnel.com.

Shared Boundaries

If a pack of hip hop skateboarders, hardcore DJs, poetry slammers, hard-bitten noir writers, and art critics threw a warehouse party in tribute to graphic-design guru David Carson, the result would feel something like *Common Boundaries* (www.commonb.com/index.html), the latest dark 'n' gritty Web mag to seethe out of New York. Hard edges and outsider art put this joint beyond the media empire mainstream, while its design and RealAudio chops would make even Hearst and Time Warner cry.





If you're tired of watching the bald guy and the fat guy carp at each other, check out the Web's own cinematic malcontent, Mr. Cranky. His bitter tour of Hollywood's latest awaits you at *Mr. Cranky Rates the Movies* (internet-plaza.net/zone/mrcranky/).

But you won't learn much about the films. Mr. Cranky hates them all and dishes it out like a prison-cafeteria worker. His rating scale fairly well defines his outlook, ranging from "Almost tolerable" to "So godawful that it ruptured the very fabric of space and time with the sheer overpowering force of its mediocrity."

Special features include Mr. Cranky's Rental Guide and a movie-by-movie forum that lets readers chime in on their own. If you feel the need to complain, you can always fill in the box labeled "Your pathetic, insignificant comments for Mr. Cranky...."

You may not have liked the idea of Richard Nixon in the White House, but how about in your computer? The people at Webcorp have digitized Tricky Dick's voice and put it in the *Richard Nixon Audio Archive* (www.webcorp.com/sounds/nixon.htm). A must-listen is the 8-Kbyte sample of Nixon's immortalized sound bite: "I am not a crook." His entire resignation speech takes up 7.4 Megs, but if that's more Nixon than you'd like, it's also available in byte-sized chunks. The famous Checkers speech is here, too. Would Nixon have appreciated the irony of his voice booming over Web browsers, decades after secret tape recordings of Oval Office conversations wound up disgracing him? Probably not.

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Seems the deep-sea slithering ink-jets are all over the Internet – a fact brought to light by *In Search of Giant Squid*, an online exhibit erected by the Smithsonian's National Museum of Natural History (seawifs.gsfc.nasa.gov/squid.html). Though the site's text level is elementary for the field-trip set, Giant Squid nevertheless offers a plethora of information for both the ignorant and the brainy. The fun includes a 3-D wireframe model of a giant squid, old drawings of squid, the scientific names of different types of squid, myths about squid, details about squid sex, links to other squid sites (including *Squid Recipes* and *EuroSquid*), and such squid literary references as Jules Verne's *20,000 Leagues Under the Sea*. OK, that's the coolest thing about this is being able to tell your friends, "I've been on the Giant Squid Web site." If that doesn't get you laid, nothing will.

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SRL

◀ 111 cal jabber such as emergent behavior, cyborgs, chaos theory, transparent interfaces, artificial life, and the machinic phylum. However, the machinic phylum and 45 cents will get you a cup of coffee. They won't get you a "Spectacular Mechanical Performance," and Mark Pauline is a hardened 17-year veteran of more than 50 such shows. His performances always boast very apt titles such as the recent *A Calculated Forecast of Ultimate Doom – Sickening Episodes of Widespread Devastation Accompanied by Sensations of Pleasurable Excitement*, and the early but classic *A Cruel and Relentless Plot to Pervert the Flesh of Beasts to Unholy Uses*.

Lately, lots of chipware and digital robotics gizmology have been working their way into the SRL act. Still, the mainstay of SRL's dramatic craft was, and remains, not the microchip but the motorcycle drive chain. Long, rattly, oily chains on big, brutish, army-surplus gear are omnipresent on SRL cre-

with such miraculous anti-fashion sense. There are women with nice hipster tattoos and creative haircuts, women who would obviously know how to dress if they put their minds to it. They have a positive genius for hideous sleeve-ripped men's work shirts, cutoff male suit-trousers over beat-to-shit leotards, filthy ponytails knotted in place with the plastic cords of industrial ear-protection plugs. There are men wearing Illinois state cop T-shirts, duck-hunter's vests, stripey Can't-Bust-Em overalls full of burn holes and grease stains, red industrial jumpsuits with the flaccid arms cinched around the waist, and, most important, tools. Tools are the primal SRL fashion accessory. Ratchets, mauls, screwdrivers, soldering irons, shopworn leather tool belts, lanyards, engineer's boots, chipped-up safety glasses. But the premier gesture of SRL roadie cachet is a robotically blank welder's mask propped onto the forehead.

Everybody at SRL welds. They consume welding rods the way other artists use charcoal sticks. The machines are all violently

powder maker, Phil who's working the Flame Balls today, Todd and Liisa, Warren and Lance, Greg the neatly trimmed fed from the Stanford linear accelerator, Debbie and Christian and Mike, Brian and Amy and Lisa and Lauren. It's a tribe. The situation has the vibe of a cyberpunk Amish barn-raising.

Dingle is finishing up his rant. "If you don't have something to do, come see me!" He has to declare this for form's sake, but it's pretty clear that nobody is going to come asking. Everybody here is already busy.

Lunch is over, and Mark's among the last to leave. He's patiently explaining to the air gun guys how to "bake the liquid out of the rounds" without any sudden untoward detonations. Then Mark gets back to his work, beetle-browed, hunched, persistent, focused. He and Dingle have the same cast of features. They look like anything but a pair of ultraviolet hipsters from the crispiest edge of the contemporary art world. Mark and Mike have the careworn look of a pair of country vets about to lose a sick cow.

Mark, though very obviously the leader of SRL, doesn't waste much time fostering the Pauline personality cult. He doesn't offer praise or criticism, he doesn't give any rousing speeches to the troops. You don't get a lot of touchy-feely and back patting hanging out with Mark Pauline. But when he's around, stuff happens.

The mainstay of SRL's dramatic craft is not the microchip but the motorcycle drive chain.

ations. Drive chains are tough, they're cheap, they work just great, and if you get anywhere near them they cover you with indelible gunk. Drive chains are very Mark Pauline.

Most of the SRL crew members have been in residence here for almost a week, sucking jet exhaust, chain-smoking, eating from big black tubs of tasty potato salad, and spattering themselves with tiny bits of flying solder. Over at the contaminated squat, they have one "shower," a water-spitting wall-mounted tap in a blank concrete cell lined with blue plastic sheeting. They sleep in bags on green canvas cots, in a vast echoing concrete hall where the least cough, sneeze, or snore sounds like a gunshot. Here, the strongest difference between the urban vagabonds at the local Saint Vincent's and the SRL crew is that SRL is much, much dirtier.

These people are setting entire new standards for nightmarish postindustrial anti-chic. Only heavy-duty cosmopolitan San Francisco Bay area performance artists, who double as the Dilberts from Hell, could dress

coming apart during the show anyhow, so when in doubt, just weld it. Failing that, bore a massive thumb-sized hole through it with the drill press and bolt it on. If that doesn't work, fetch the bungee cords, the C-clamps, and the metal epoxy. Don't worry: if you use too much, you can always trim it back later with the metal saw.

Fifty people who can weld, glue, saw, and clamp will get a lot of results. Mark and his longtime majordomo Mike Dingle are very results-oriented guys. Dingle bellows at the crew, reading from a filthy yellow notepad. "Home Depot's open till midnight! Whaddya need?" People raise their hands and ask cordially for duct tape. "Who's gonna fix that Allen bolt on the winch?" Two people volunteer at once. "We need more coffee grinders!" another shouts.

Jets from the airport roar periodically overhead, reducing everyone to involuntary silence as they munch their veggie salads and slurp their coffee. They all know each other. It's Scott the pyro guy, Kevin the

The show officially starts at 11. I go out to join the line at the ticket door and eavesdrop. (No doubt I could pitch in with the crew if I wanted, but I'm a novelist by trade – I could cut my thumb off slicing a bagel.) The clean-cut college kid in front of me is talking to his friend. "Yeah, he blew his hand off and had some toes sewn on for fingers!" I've never read an article on SRL that failed to take note of Pauline's injured hand. His uninjured left hand is also quite remarkable, very sinewy and dexterous, a real craftsman's hand. His left hand is probably the best-looking thing about the guy.

Not much happens till midnight. The audience filters in to stare in disgusted awe at the dozen inert machines and the truly vile backdrop of billboards with graphic images of such goeey and revolting hideousness that the eye can scarcely absorb them: a nude man absently hugging a withered starving child; a nude and hugely pregnant blond ostentatiously enjoying a tall ▶

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SRL

◀ 154 beer and a cig; a wailing fetal head perched on a rubbery neck 6 feet long between a pair of devil-children sporting tridents. Mark used to deface other people's billboards as "pranks," but he's likely too famous for that amusement anymore. Now he can make his own billboards and set them on fire.

Hundreds of people stand patiently on a ramp of yellow dirt while the SRL crew confers over their silent machines. You'd think that people who tear animal carcasses apart with power machinery would be wild party animals, screaming drug-soaked Visigoths, utter no-brakes destructo psychopaths, but nothing could be further from the truth. Their meals are vegetarian, their manners soft-spoken, and until the gig is over they don't even drink. Now they're clustered about, muttering quietly and making various last-minute hardware checks.

I'm convinced that this silent display is the one conspicuous ego-gratification that

expensive – fire permits, which Pauline says "won't happen."

Earplugs are distributed, which help, a bit, with the "music." Mark usually plays at least an hour of impossibly inane or relentlessly irritating soundtrack to work the crowd into a properly destructive mood. Shortly after the midnight sirens go off and the fun starts.

The BombLoader, a previously inert piece of army green machinery, lurches into a nasty parody of life. More than life, really – the thing assumes actual *character*. BombLoader becomes a great horny galoot, his aluminum "bomb" thrusting and wiggling rudely. He stumbles drunkenly across the dirt. Eventually it becomes clear that the vile beast is heading for the appealing ventral orifice of the V-1.

V-1 isn't having any of this. She waggles coyly and spins aside repeatedly, perhaps taken aback by BombLoader's insistent aluminum organ. Now a few of the billboards begin to spin in place, thankfully diverting some attention from this unbearably

nose for this performance, and he sidles crablike toward BombLoader, radiating sibling menace and sinister intent. Its penile crown is a slaughtered and skinned cow's head, its raw blind eye sockets thoughtfully decorated with long metal skewers.

V-1 decides to roast one of the billboards.

Roman candles are launching flaming balls off the roof of the warehouse. They explode mere feet above the heads of the audience, loading our hair with stinking airbursts of chemical cinders. Spark Shooter is emitting long flaming streams. Air Launcher apparently isn't working for the moment, but nobody's missing it much. Dummy after flaming dummy catapults from stage left. Running Machine has clomped into the picture, on six insectile legs with crazily ingenious plastic feet. It brandishes an enormous *Rambo III* knife at BombLoader.

Even this horrific level of damage is still terribly frustrating. The audience direly wants the absurd and disgusting machines to kill one another harder and faster. Their febrile, fitful, vicious efforts clearly emanate from some unspeakable mental state of mechanical fury, some level of verminous degradation so vile, so low on the scale of cosmic organization, that it's denied even to rats, tapeworms, and roaches. But the hideous bastard things won't kill each other *fast enough*; it's all one can do not to jump out there and help.

When the V-1 attacks the House, the innards of the little stage shack, stuffed with fuel-oil-soaked rags and stacked lumber, go up in a tornado of flame. A twister of fire four stories tall dominates the neighborhood, and one can only wonder what the flying canloads of involuntary audience in those incessant aircraft are making of all this.

At last the entire nexus of billboards collapses in entropic Götterdämmerung. When the crew comes out with fire extinguishers, it's all over. There are cheers and whistles. Nobody asks for more. The crowd leaves as if damned glad to go.

Mark Pauline is not a great dramatist. If he were, he'd have a much wider emotional palette. He is, however, a very strong artist. It's impossible to spend any time in Mark's company without coming to respect his commitment and the power of his vision.

It's not all that difficult to become a 157 ▶

The things won't kill each other *fast enough*; it's all one can do not to jump out and help.

SRL roadies allow themselves. Anonymous craftsfolk of mechanical mayhem, they don't get their names in lights, they never get their own round of applause. However, they do rather enjoy stalking ostentatiously back and forth in front of the impatient audience while chatting over their headsets and making small arcane adjustments. The fact that they get to serenely ignore the audience while doing all this important inexplicable technical stuff is clearly a big part of the kick.

Fourteen hundred people is not a huge crowd for an SRL gig, but it fills the Phoenix venue. Pauline, quoted in *The Arizona Republic*, said, "SRL is on a public service mission to spread San Francisco's careless attitude toward life, liberty, and the pursuit of intensity across America." Ironically, Mark Pauline has been all but banished from San Francisco, where recent legal wrangles prevent him and his mighty robots from performing in their home town without purchasing the required – and exorbitantly

obscene display.

BombLoader gets his way with a nasty series of jerks, humps, and screeches. He then backs off, apparently satisfied. V-1, scorned and furious, suddenly cuts loose on BombLoader with a withering blast of jet flame. The stink, dust, and shock are indescribable. Screams of disgusted glee explode from the audience, audible even over the sirens and the earplugs.

The angry and baffled BombLoader turns to vent his stupid fury on the Ark. The Ark, a skeletal shiplike device made mostly of leftover rafters from Therrien's Icehouse, is slow to anger. When it wakes, however, its eerie rage is made nastily manifest. It thrashes a long knuckly flower stalk of steel and cabling, and opens a spinning tub-sized blossom with a stamen that's a mummified dog's head. Triple teeth of axlike butcher's steel spin and gnash at the Ark's prow.

Screw Machine rattles over gamely to pick a fight with BombLoader. Screw Machine, a veteran SRL device, has a long phallic metal

SRL

◀156 successful counterculture artist in America. Peter Max, for instance, has become the "Official Super Bowl XXX Artist" and is having a reception and exhibit in tony Scottsdale's J. R. Fine Arts gallery this weekend. The astonishing thing about Pauline's art is that it obeys no logic, no shibboleths, and no rules other than the inherent nature of Mark Pauline.

He calls it "spectacular machine performance," but what does that coinage mean? It isn't drama; there are no human beings, no dialog, scarcely a script. It isn't "destruction derby for the dressed-in-black crowd," because destruction derby, for all its many merits, does not confront you with the very worst feelings you have ever had. It's not "satire," unless a chunk of concrete dropping from a clear blue sky onto somebody's yuppie Saabmobile also counts as satire. It isn't sculpture, because it won't sit still on a pedestal.

David Therrien talks about the possibility

Mark doesn't care if it's "art" or if it's "technology." He never looks for reviews in the art press or drama press (though he's quite expert at attracting attention). He rarely teaches or asks for NEA grants or for federal, state, or local art support. He doesn't care if it's "theater" and doesn't crap out to build special-effects gadgets for Hollywood, where the big money and big audiences are. What Mark Pauline wants (and will have, and has gotten, despite all odds) is a space to breathe, where he can be a spectacular boilermaker dramatist punk social critic who builds jet engines and rips animal carcasses apart, all at once, all the time, and the rest of the planet will have to accept him on his own terms and no other terms, at all, ever.

He's bent the magnetic lines of postmodern culture into a kind of superconductive arc where he can levitate indefinitely. People sense this about Mark Pauline. This ability is a rare thing, a big thing. The appeal is very strong.

None of this denies the deeply problematic aspects of SRL. SRL's art is ugly, nasty,

time and trouble.

Mark's work can be shoehorned into the "art" ghetto if you work at it. But it looks and smells very much like certain other kinds of contemporary cultural activity. The holocausts of flaming oil are little versions of the machine dramatics of Saddam Hussein, who set fire to Kuwait just to produce a nice tank-war stage set for a personal attack of megalomania. The sight of machines macerating cattle flesh is an evil but accurate echo of mining machinery in Serb-held Bosnia clumsily obliterating the dead meat of the vanished. Turn up the amps on SRL, adjust your set, and you suddenly have Aum Shinrikyo, gentle New Age vegetarian Pacific Rimsters, many from technical backgrounds, breaking out in a murderous collector's frenzy for high-tech, neat-o, extremely dangerous stuff. Not just the homemade bottle-rocket sarin-dispensers that got them so much press, but all the *other* cool Shinrikyo gear: the electronic neuron hats, the stainless steel basements full of giant microwaves, the ninja enforcers buying junked Russian tanks, the big and bouncy botulism breweries, the Ebola virus hunters, the giant microchip factories.

None of this happened because a half-blind master criminal in white pajamas needs his own microchip factory. It happened because the whole deadly clutter of postmodern tech is inherently fascinating in a particularly sickening and dangerous way that most of us cannot rationally sense. It's fascinating and evil, with the same imp-of-the-perverse element that makes humanity's automatic rifles look as lovely as a sonnet while the homes and buildings and cities where we live and work and sleep and love tend to look like the crappy cartoons those rifles came in.

This is what Mark's work is about, what Mark Pauline really understands. The invisible becomes visible, everything that is repressed in the sterile prison of so-called rational engineering returns in a hideous and terribly authentic guise of claws and spikes and fangs. Everything that industrial society would prefer to forget and ignore and neglect takes on a pitiless Frankenstein vitality. It isn't beautiful, it isn't nice, it isn't spiritually elevating. It casts the darkest kind of suspicion on the lives we lead and the twisted ingenuity that supports those lives. And it offers us no answers at all. ■ ■ ■

Mark Pauline has bent the lines of postmodern culture into a superconductive arc.

of collecting and showcasing performance machines for the museum and collector crowd, but there would be something very sad about that – like an African ritual mask taken from the dancers and put in a Plexiglas box. It might well be collectible, but it wouldn't be Mark Pauline.

If SRL were just some shallow attempt to grandstand and outrage the bourgeoisie, then the effort would have lasted about as long as the average rock band. But Pauline's hair is shot with gray: he's given this effort the best years of his life. It is his life, he has no other.

You take some gravel-hearted techie kid from Florida who knows how to weld boilers, put him in art school and teach him about graphic design and experimental theater, let him hang out with punk musicians even though he doesn't like music (one of the oddest things about SRL is that they don't listen to music on the job), and he finds his life's work. He gets a savage, brutal hammerlock on his Muse.

and brutal. Mark has been very honest and straightforward about this. People should take him at his word when he says (as he told *New Times*, the Phoenix counterculture paper) that he is basically driven by hatred. "I hate the practical world. I hate the way things work. But I don't want to just sit around and be a vegetable. Doing SRL is the best solution I've been able to find because it relieves the pain without causing death." Or when he states bluntly that "all technology is military technology; no technology is civilian technology." Or when he compares his theater to a military campaign. He isn't kidding about any of this.

One might be tempted to think that Mark Pauline is merely promoting his show in the P.T. Barnum tradition or playing the ever-popular tortured artist. This just isn't the case. Mark Pauline is a creative force first, a human being second, and a nice guy at a very distant tenth. If Leni Riefenstahl had had the guts to talk that candidly, it might have saved the rest of us a lot of

Meme-to-Meme Combat

One controversial issue.

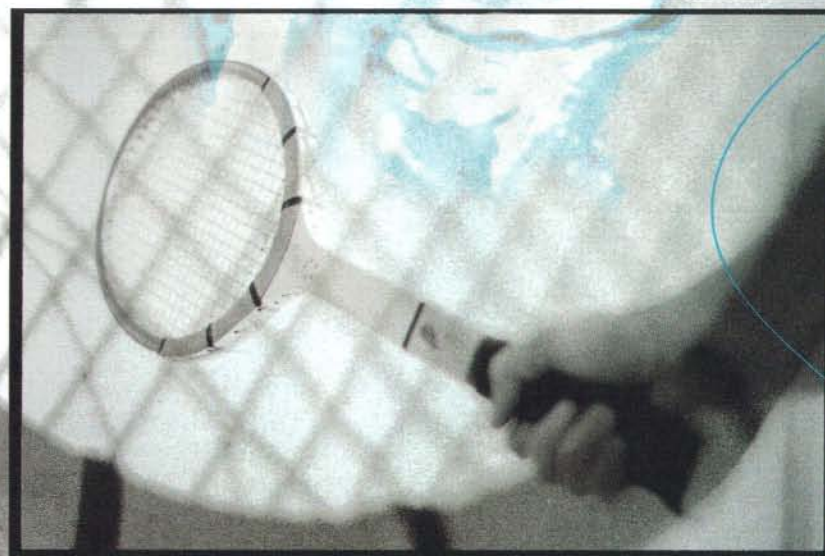
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Microsoft 3-D

◀ 118 Henry Ford would feel right at home here, because, in the nicest possible way, it's a production line.

I'm being treated like a loose cannon. Everyone's on guard. A public relations representative accompanies me, monitoring each conversation and taking copious notes. In one office, pinned to a bulletin board, I notice a multipage memo warning people what to say – and what not to say – during Charles Platt's visit. Still, after some negotiation, certain assurances have been given. I *will* be allowed to see some 3-D goodies, and I *will* talk to the Graphics Gods Microsoft has acquired with the obsessive completism of a kid collecting baseball cards.

First, though, I meet the man who created the research department.

Nathan Myhrvold is a cheerful, chubby fellow with a pink-and-white complexion, a sandy beard, and brown curls flopping over the collar of his white sweatshirt. In blue pants, loafers, and wire-framed glasses, he's a prototypical Micronerd – also, of course, a multimillionaire, since he's been with the company for 10 years. (Generally speaking, any coder who arrived here more than five years ago has stock options worth a couple million.)

Myhrvold has been referred to in the trade press as "Microsoft's Mastermind." (See "The Physicist," *Wired* 3.09, page 152.) He's a member of the Office of the President and reports directly to Gates.

His office is triple-size, with a view of distant snowy mountains. He even has a secretary, for heaven's sake.

Myhrvold established the research department in 1991 after he wrote a memo suggesting that there was no reason why research should always be done at academic institutions. Initially, he says, "a lot of people were afraid we would fall into the same trap as Xerox PARC or Bell Labs." He shakes his head knowingly. "Those companies did a lot of research they had no business doing."

The implication is clear: Microsoft managers are expected to be savvy

physics, he used to do research on cosmology and quantum gravity and quantum-field theory in curved space-time with Stephen Hawking, and he still serves part-time on the advisory board of Princeton University's department of physics. Regarding his academic past, he says, "I do miss the purity of truth-finding."

Yet he happily traded it for a chance to "touch the lives of millions of people," and other computer scientists were willing to make much the same deal. First he lured researchers from IBM to work on natural language processing. Graphics research commenced two years after that.

"Most people want to have some impact," says Myhrvold. "We convinced them that here, their work could touch the lives of millions."

enough to keep computer scientists under control and stop them from straying into "inappropriate" areas. You might think researchers would find this unpleasantly limiting, but according to Myhrvold they love it. "Most people in computer research want to see their work have some impact," he explains. "We convinced them that here, their work could touch the lives of millions of people. This was a unique value proposition."

The usual goal of a scientist is to uncover truths about the universe. Myhrvold knows this well; he has a doctorate in theoretical/mathematical

What, specifically, are they working toward? "We're assuming great increases in processing power," says Myhrvold. "Five years hence, you'll record video straight onto the computer, and it will be a standard data type. By Christmas 1997, we're going to have MPEG video in every machine."

And if this sounds a bit prosaic, Myhrvold is quick to evoke the shared vision thing: "These tools have no precedent in the analog world. How many Spielbergs or Picassos never get to exercise their talent because they never have access to tools or audience? I believe that if 161 ▶

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Microsoft 3-D

◀ 159 we are able to empower millions of people with these tools, there will be a large and positive benefit. If the population of the Earth reaches its full creative potential and develops works of intellectual property that can be communicated with reduced friction of distribution, we could see a digital renaissance."

One of the IBM people who came to Microsoft was Dan Ling. It was he who assembled the 3-D graphics team.

Ling may be the only person on the Microsoft campus with a short, neat haircut and a starched, pale-blue shirt buttoned at the neck. His desk is clean and tidy. His black leather briefcase sits neatly on a gray file cabinet. He's very polite, very low-key, and very corporate.

At IBM's Thomas J. Watson Laboratory, Ling worked on virtual reality simulations. Consequently, he says, "when I came to Microsoft, 3-D interactive graphics interested me. We now have a combination of software and hardware ideas, which independent hardware vendors might want to build into their products."

Let me try to rephrase this highly diplomatic statement. It seems that Microsoft meets regularly with video-board manufacturers. None of them is big enough to establish standards on its own, so the hardware specs are devised "jointly," with Microsoft taking the lead. In other words, the software company is now setting standards for hardware.

Like Myhrvold, Ling used to be more of a scientist. He holds seven patents. He co-invented video RAM. "It is a loss," he says, when I ask him if he misses theoretical work. "But there are compensations." And though his style is very different, he goes into a soliloquy remarkably like Myhrvold's. "Seeing work being

unreal surfaces. "A lot of the research I've been doing over the last two decades is just now becoming relevant," he says, "because we didn't have the hardware to handle the computationally intensive calculations till now."

But what, exactly, are his techniques going to be used for?

"I wanted to be somewhere I can actually do things and have an effect," says Kajiya.

put into practice is important. At IBM, we had a very hard time making an impact on the company as a whole, but people here are strongly motivated to think about how an idea could wind up in a Microsoft product and end up on a million people's desks."

Jim Kajiya does the hands-on work of leading the 3-D graphics group. He's a total contrast to Ling: laid-back and informal, smiling a lot as if the idea of working at Microsoft still amuses him. With long, wild hair and frizzy sideburns, he looks like a Zen master or a hermit; but his office is a friendly place with a stereo and well-stocked bookshelves. He even has a full-size leather couch, though it's a tight squeeze. He sits on his office chair, and I sit on the couch; our knees are about 6 inches apart.

For 15 years, Kajiya worked at Caltech tackling 3-D problems such as rendering "touchable" graphics instead of smooth,

He fidgets. "I still have the instincts of an academic," he says. "In academia, all information is free. But here --" He spreads his hands apologetically.

Well, we're thinking about cyberspace, right? Does that mean virtual shopping malls?

"Oh, no, that's not very interesting. Cyberspace is about interacting with each other."

Kajiya points out that if we go for a walk while talking to a friend in the real world, we interact using a mix of words, expressions, gestures, and movement -- and we're simultaneously aware of the environment. Point-to-point video isn't capable of conveying this experience, but 3-D graphics can do it if the synthetic world is properly modeled and each person is represented by a suitable agent.

This sounds like cyberspace as predicted by science fiction writers such as Vinge or Stephenson. "Yes," Kajiya agrees. "That vision is commonly accepted -- 162 ▶

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Microsoft 3-D

◀ 161 at least among a relatively lunatic fringe of computer scientists. People assume it will just get done, somehow. But someone needs to figure it out for real. I'm very serious about making this happen."

Does he expect to realize it within, say, 10 years?

He hesitates for an instant, as if he might have had an earlier date in mind. Then he reasserts his diplomatic self-control. "Ten years," he says. "Yes."

Like Myhrvold, Kajiya has a grandiose long-term vision. "It's clear to me that what we're doing collectively is inventing a new medium. I think that's a pretty big deal. New media don't come along all that often, and when they do they cause tremendous social and cultural changes in our civilization. Writing, radio, television - 500 years from now those media are going to be largely forgotten. This digital, interactive, shared-spaces medium is the thing that's going to survive from this culture in a significant way."

And for Kajiya, Microsoft is the best means to the end. "When you're in acade-

conference. It would be, er, procedurally unacceptable to show me work that's currently under consideration.

Still, there are a couple of little things I can see. Hoppe slides a tape into a VCR. "This is an algorithm I developed," he says, sounding half shy, half proud. "It's a method for simplifying polygons in geometric modeling."

The video displays a kind of cubist sculpture built from angular, flat-faced objects. Then the faces start dividing themselves into smaller faces, and smaller still - till they become a continuous, smooth surface, a fully modeled replica of a human head. "This technique would be particularly useful online," Hoppe explains. "It's like a progressive GIF."

In other words, you won't have to wait for a full rendering to come down the wire; you'll get an approximate impression, and you can move on to something else as soon as you lose interest.

"Also," says Hoppe, "it doesn't take more storage space than the original complex image."

Now Gortler takes over. He demonstrates a system that he developed with another researcher, Michael Cohen, for

grins. "A lot of people thought we'd just be working on the next version of Excel."

Automated techniques stand in stark contrast to the work of Jim Blinn, who epitomizes Thomas Edison's famous maxim, "Genius is 1 percent inspiration, 99 percent perspiration."

Blinn created his first computer graphics back in 1967. He had to print them onto paper because he lacked access to video monitors with graphics capabilities.

Blinn is a fascinating character. He's a tall, modest man with a graying beard, looking slightly disheveled in a buttoned cardigan, like a 1950s math professor. In his spare time he plays the trombone, and he writes regular semihumorous math columns for the *IEEE Computer Graphics and Applications* journal. His list of favorite movies includes *Death-stalker II*, *The Brady Bunch Movie*, *Amazon Women on the Moon*, and *Beach Babes from Beyond*. Under the heading of "really good books that have changed my life" he mentions a couple of titles by Dr. Seuss, whose *Oh, the Places You'll Go!* was read aloud at his wedding.

If this seems a confusing mix of science and whimsy, it rests on a serious bedrock of obsession. Blinn has always been fascinated by every aspect of computer graphics. He met Jim Kajiya back in 1974. "He was the hardware engineer on the first frame buffer display," Blinn recalls. "And I was the first grad student waiting to play with it."

After inventing a couple of 3-D rendering techniques that are still used today, Blinn moved in 1977 to JPL, a division of Caltech. "I was the first human being ever to see a complete map of the surface of Ganymede. I copied data from the image processing group, and I processed it myself."

From that time on, Blinn did just about everything himself - because, he says, there was no one else to do it. "The first animation I produced for JPL, in 1979, was just barely technically possible. In fact, management didn't believe it *was* possible."

That simulation showed - with scrupulous accuracy - the solar system as seen by Voyager space probes. Even by modern standards the sequences look ambitious, including shifting perspectives and plan-

Blinn has been test-running a 3-D application interface named Direct 3D and an interactive program called Active VRML.

mia, you write papers and eventually those ideas get used by other people, but it's a very long pipeline." He looks at me frankly. "I wanted to be somewhere I can actually do things and have an effect."

Kajiya looks surprised and worried when I mention that I was told I could view some of his work. I'm escorted to a lounge area - where I wait. I sense hasty conferences offstage. Finally my PR escort returns with two young members of the graphics team, Hugues Hoppe and Steven Gortler, both of them looking startled by the prospect of talking to a journalist.

I'm told that Microsoft's most impressive 3-D samples are currently being evaluated for inclusion in this year's Siggraph, the annual computer graphics

automatically converting real-world objects into 3-D data. A bowl of fruit is placed on a flat white panel marked with distinctive black circular targets. Two more panels are placed behind the bowl. An observer captures the setup with a camcorder, shooting from various angles. The video frames are then automatically analyzed to capture and organize the way that light leaves the scene, in a process similar to making a hologram. This way, a graphics landscape can be quickly populated with solid objects captured from the real world as easily as we capture 2-D objects using a scanner.

"When people see the quality of our work here, they'll have to reevaluate their guesses about what's happening in our group," says Gortler, after his demo. He

Microsoft 3-D

ets performing the intricate ballet of orbital mechanics.

Creating the effects entailed relentless drudgery. "I used to copy-type numbers from blueprints into a text editor," Blinn recalls. "I invented a little modeling language to convert that data into solid images of the space probe itself." To render each planet, Blinn obtained assorted pictures and mapped them onto a flat surface. He painstakingly joined the flattened photos, then mathematically rewrapped them around a sphere and applied a suitable texture, "all using my own tools," he says with a shrug.

He ran a PDP-11 day and night for nearly four weeks, yielding number sequences that were saved on magnetic tape. Then it was time to copy the images onto 16-mm film - which presented a problem, since a system to do this didn't yet exist. Blinn had to capture one frame at a time using a movie camera pointed at a video screen where images were generated with painful slowness. "I sat there changing the tapes every 45 minutes for about eight hours. Then I got the film back from the lab two days later and found the exposure was wrong, so I had to do it all over again."

All this for a five-minute sequence. "You had to be motivated," Blinn remarks dryly. "You really had to want to see that movie."

His work had an important influence, though. It was the first computer animation many Hollywood special-effects people ever saw. For a brief three months,

he worked with Alvy Ray Smith at Lucasfilm, but Blinn was wary of the movie business. "There's a lot of financial risk, and your stuff may get edited out of the movie. It seemed more heartache than was justified. I was more interested in making films myself."

Blinn created some sequences for Carl Sagan's *Cosmos* series, and he did two educational series on PBS, *Project Mathematics* and *The Mechanical Universe*. The latter, in 52 parts, contained about eight hours of animation. Blinn describes it as "a gargantuan effort over a period of three years." As always, he worked solo, even doing some of the scriptwriting.

"Microsoft was the DOS company, and for us Unix guys DOS was a joke," recalls Smith.

"Ever since my childhood in a small town," he says, "I have learned to be self-sufficient."

He stayed at Caltech for almost 20 years - and then was laid off in 1995 when his last project ran out of money. His old friend Jim Kajiya didn't have to try too hard to persuade him to join Microsoft.

Eventually, Blinn says, he'd like to get some of his rendering techniques running under Windows. In the meantime, he's been test-running graphics tools that his friends here have been building, including a 3-D application program interface named Direct3D and an interactive language program called Active VRML.

This is the first time he has functioned as a member of a team, but he's happy to be here, just as everyone else claims to be, and for the same reasons. "Research groups care whether their ideas will make it into products. I now have a channel into products that are going to be used by millions of people." He pauses, formulating one of his modest, matter-of-fact statements. "It's nice knowing that the results of your work are going to get a wide distribution."

Alvy Ray Smith leans back and puts his sneakers up on his desk. Handsome, silver-haired, and silver-bearded, with

a western style of speech and dress, Smith has an energetic, powerful presence.

"What I'm trying to do," he says, speaking rapidly but emphatically, "is make sound and pictures ordinary."

Fifteen years ago, wordprocessing or database programs were new enough to be exciting. Today, they're basic tools of the trade. Smith wants multimedia to follow a similar curve.

"We'll have real-time 3-D video in 2003," he says in his authoritative style, as if a release date has already been confirmed. "By that I mean we'll have the power to compute 30 frames a second in 640-by-480 resolution." 164 ►

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Microsoft 3-D

◀ 163 He has personal reasons for wanting this to happen. "I keep wanting to make art," he says. "But I keep realizing the tools aren't there. I think I'm going to be spending most of my life constructing the tools. It's a lifetime commitment to make this happen." He pauses and frowns. "I just hope everyone remembers who did it, and how it got there."

Smith has certainly done his best to be memorable. His résumé reads like a list of great moments in computer graphics. He joined Xerox PARC in 1974 and produced work that found its way into the New York Museum of Modern Art. He arrived in the nascent stage of the Computer Graphics Laboratory at the New York Institute of Technology, where he collaborated with moviemaker Ed Emshwiller and co-invented the Alpha Channel, a concept that became so ubiquitous it appears even in mass-marketed programs

form by Microsoft?

He shrugs. "Presumably."

Why did he choose to come and work here? He answers in a characteristically blunt style. "They were out shopping for imaging software, and we won the competition. I had to go through a bit of adjustment from an eight-person company to 20,000, but I'm treated very well here. I have some of my favorite colleagues, the company is hungry for the knowledge that we have, my wife has always been hammering on me to move back to Seattle, and I got paid well for Altamira. We were afraid, negotiating with Microsoft, that they'd dance with us, steal our ideas, then kiss us off. But they were gentlemanly in all negotiations."

Smith seems to enjoy his elder statesman role on the campus, where he circulates a series of technical memos lecturing his co-workers and "laying down pieces of philosophy," as he puts it.

Seeds of binary code taking command of millions of computer systems – it's a sci-fi vision.

such as Photoshop. From 1980 through 1986, he was director of computer graphics research at Lucasfilm; while there he directed the beautiful "genesis" sequence for *Star Trek II: The Wrath of Khan*, depicting the spread of life across a new world. He co-founded Pixar (where the classic *Tin Toy* animated short was made), then Altamira, which was then acquired by Microsoft.

Here in Smith's office, his image-editing program, Altamira Composer, is on the screen. "No other software lets you do this," he says, quickly retrieving a half-dozen color photographs of objects and dragging them around. The images are like fragments torn from a bitmap, yet the program preserves their separate identities, so they can still be selected as objects. "Pixel graphics and geometric objects don't normally coexist in the same space. Very few people really understand how to make that happen, but I do."

Will Composer be marketed in some

He's also concerned with strictly practical, unglamorous organizational matters. "You can't just have a 3-D system," he says, "you have to have content management married to it, along with a sound system. Does any of this exist? No. People have talked about it for 20 years, and now we're doing something about it. What's astonishing is that it's Microsoft. Microsoft was the DOS company, and for us Unix guys DOS was a joke. All my life I used Unix-class machines and laughed at the PCs – they were little toys. I saw the Home Brew Computer Club when it was out in a garage in Menlo Park, and people thought I would be interested, but I wasn't because they couldn't do pictures. When I finally bought a 386, I was amazed to find it was an 8-mips machine. At Lucasfilm, all the work we did on *Tin Toy* and *Star Trek II* was on 5-mips systems, or less."

Like his colleagues, Smith has done his share of hands-on programming over the

years, first in assembly language, then in C++. At the same time, though, he's an exhibited painter, and his work has appeared on book and magazine covers. His uncle taught oil painting; his father was an amateur artist and a school-teacher. "I didn't get slapped when I tried to paint on the refrigerator," Smith says. "That may be the difference between people who think they can paint and people who think they can't."

He also grew up in close proximity to technology. "I come from New Mexico, near White Sands, where they test-fired rockets. I remember one day coming around a curve and seeing an Atlas missile beside the road. I heard the first atomic bomb go off. My great-uncle's ranch was right next to Trinity site."

More than any of the other graphics researchers, Smith uses an aesthetic vocabulary. I ask him if he can define the aesthetic qualities of computer graphics that seem to exert such a powerful fascination.

He thinks for a moment. "You know, people always ask me if we're going to be able to do accurate simulations of famous actors. Always! But whenever I hear these questions, I sense that there's something else that's really being asked. Is it just fear of human beings being replaced? No, I think it's more like awe. Maybe people have a desire for something ideal. Personally I cannot make the leap of faith to believe we can simulate actors – or if we do, it'll be so difficult, it would be cheaper to use a real person. But to a limited extent we can create perfection: the ideal apple, the ideal landscape. Perhaps that's where the fascination lies."

In which case, 3-D may be most effective if it retains an ethereal quality instead of trying to simulate the rough edges of reality. *Toy Story* was memorable partly because it looked subtly different from the real world. Adult characters in particular were highly stylized – which was deliberate, according to Smith, because a creature that's almost human looks intensely disturbing. "If you get close to rendering a human being, you'd better be damned close," he says. "In *Tin Toy* we included a baby; it worked in that movie because it was supposed to look monstrous, but

Microsoft 3-D

the lesson was loud and clear.”

According to Smith, though, the power of graphics extends far beyond mass entertainment. He points out that computers have a unique ability to control complexity. Science and engineering used to be reductive, simplifying tasks; but now, as he puts it, “complexity is OK.”

Here, then, is his version of the shared vision. Since computers can cope with complexity, he has an intuitive feeling that they’ll be important to a world that contains billions of people and is still experiencing population growth. And graphics can help to make communication as effective as possible.

Of course, this assumes that computing power will spread into lower-income groups. Smith sees this as inevitable. “There’ll be millions of old computers you can pick up for a dime. That’s why I want to make this software seem ordinary. I want anyone to be able to use it.”

And this, in turn, is why he’s happy to be at Microsoft. In the past, he says, he felt like Captain Cook, mapping the territory of computer graphics. That was exciting, but now it’s time to share his vision on a mass scale. Where better to do that than in a company known for its marketing skills?

“This is the best place to do what I’ve been wanting to do,” he says. “We did this stuff out of sheer love for many years – but we had to suffer a lot of pain. Today, there’s enough computing power around that we shouldn’t have to suffer anymore.”

In the 1970s, computer graphics was a tiny field. A 1-mips computer with RGB frame buffers capable of full-color rendering cost maybe US\$500,000 in 1975 dollars, and you had to be a programmer to make it work. Since few people could write code and create art, the first Sig-graph conference attracted only 600 people, and they stayed the night in a college dorm where they showed each other videos in the evening. They were a tight-knit fraternity.

Then came microcomputers, and then came the concept of virtual reality. Now 3-D modeling seems integral to the online future.

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Put yourself in the position of those graphics pioneers, who worked for decades, always underfunded, in relative obscurity. Now factor in that programming is still largely a male occupation. Writing a program means you create something that feels like a piece of yourself and is disseminated to other systems where it takes on a life of its own. The reproductive metaphor is painfully obvious.

Additionally, the programmer/machine relationship appeals to people who enjoy being in control. First the computer does what you tell it to do, then the software functions as your surrogate and makes other computers do the same thing.

It’s no surprise, then, that software designers talk about wanting to have an impact. This is why some of them give away their programs as freeware, and it’s also the reason a program’s success is almost always measured by the number of units shipped.

Maybe this all helps to explain the Redmond voodoo, the fascination with software, the lure of computer graphics, the buying frenzy triggered by products such

as Windows 95. Even for outsiders, there’s vicarious excitement in seeing the strange power relationship between programmer and software, software and machine, machine and user. Seeds of binary code taking command of millions of computer systems – it’s a science fiction vision, like a benign alien invasion. And since 3-D graphics have that element of otherworldly strangeness, they seem totally appropriate to the medium.

Meanwhile, to a programmer with that lust to disseminate his vision and a not-so-subtle desire for people to “Be reasonable – do it my way,” a company like Microsoft isn’t a malevolent giant – it’s a generous patron and a heaven-sent collaborator. Press reports suggest that more than 2,000 of its employees are now stock-option millionaires who can afford to quit anytime, yet they still go on working there, enjoying their role in reaching out and molding our future.

So, why would a bunch of feisty graphics pioneers choose to join them?

Better you should ask why they would want to go anyplace else. ■ ■ ■

Kids

◀ 123 is not the embodiment of some utopian vision; she can at times be difficult, rebellious, obnoxious, moody. But she makes a good-faith effort to resolve differences rationally and verbally. Saintliness is not required.

ARTICLE IV

The Moral Foundation

The Responsible Child does not appear miraculously but emerges as a result of years of preparation and education. Her conscience and sense of responsibility don't spontaneously form at the legal age of adulthood. They are built into her life early through thoughtful parenting and a complex series of relationships.

The vast literature on children and child psychology contains arguments about every conceivable child-rearing issue. But respected experts conclude nearly unanimously that dominant char-

(who use it to frighten or rally supporters), of powerful religious groups (that can't teach dogma to the young without control), and of journalism (which sees new media and new culture as menaces to its own once-powerful and highly profitable position in American society).

As powerful as they are, media and culture – or the sometimes offensive imagery transmitted by them – can't form our children's value systems or provide the building blocks of conscience. Only we can do that.

ARTICLE V

The Rights of Children

The Responsible Child has certain inalienable rights, not conferred at the caprice of arbitrary authority, but recognized by a just society as inherently belonging to every person. As we enter the digital age, this recognition is inevitable, a powerful idea that will bring children into the vast community of peo-

their school curricula.

- ★ Children who meet their personal and educational responsibilities ought to have nearly unrestricted access to their culture – particularly if they demonstrate an ability to maintain balance in their lives.
- ★ Children have the right to assemble online, to form groups, and to communicate with like-minded communities through Web sites and homepages, online services, email, and the range of possibilities created by the Net.
- ★ Children have a right to challenge the use of blocking software and other technologies, like the V-Chip, that arbitrarily deny them choice, exposure to ideas, and freedom of speech.

Children's rights are not synonymous with permissiveness. Scholars of childhood agree that children need clear boundaries and occasional discipline. But if children have the opportunity from an early age to make informed decisions about themselves – what to eat, when to sleep, what to wear – they will be able to take a measure of control of their cultural lives by their teens.

These rights are not a gift conferred out of the goodness of our hearts, but the fulfillment of the most basic responsibility of parents: to prepare children for the world they will live in.

ARTICLE VI

Negotiating the Social Contract

How would a Social Contract about media and culture – a truce between adults and children – work?

The model envisioned by Locke applies eerily well to kids. By definition, a contract is agreed upon, not imposed. Its power comes not from arbitrary authority but from a moral base, a desire to do the right thing for everyone, to respect and understand the rights and needs of all parties. Parents and children would both have to want an agreement that ratifies the children's rights and makes responsible parents yield some of their power while feeling safe about it.

The rational adult has to begin by accepting that censorship and arbitrary controls don't work, that he or she has to thrash out a shared value system with his or her children. Attempting to censor children can undermine authority and values rather than affirming them. Since most older children and their

The Responsible Child has inalienable rights recognized by a just society as inherently belonging to every person.

acter traits don't just appear during the teen years. They get formed much earlier, from the interactions and environment provided since infancy.

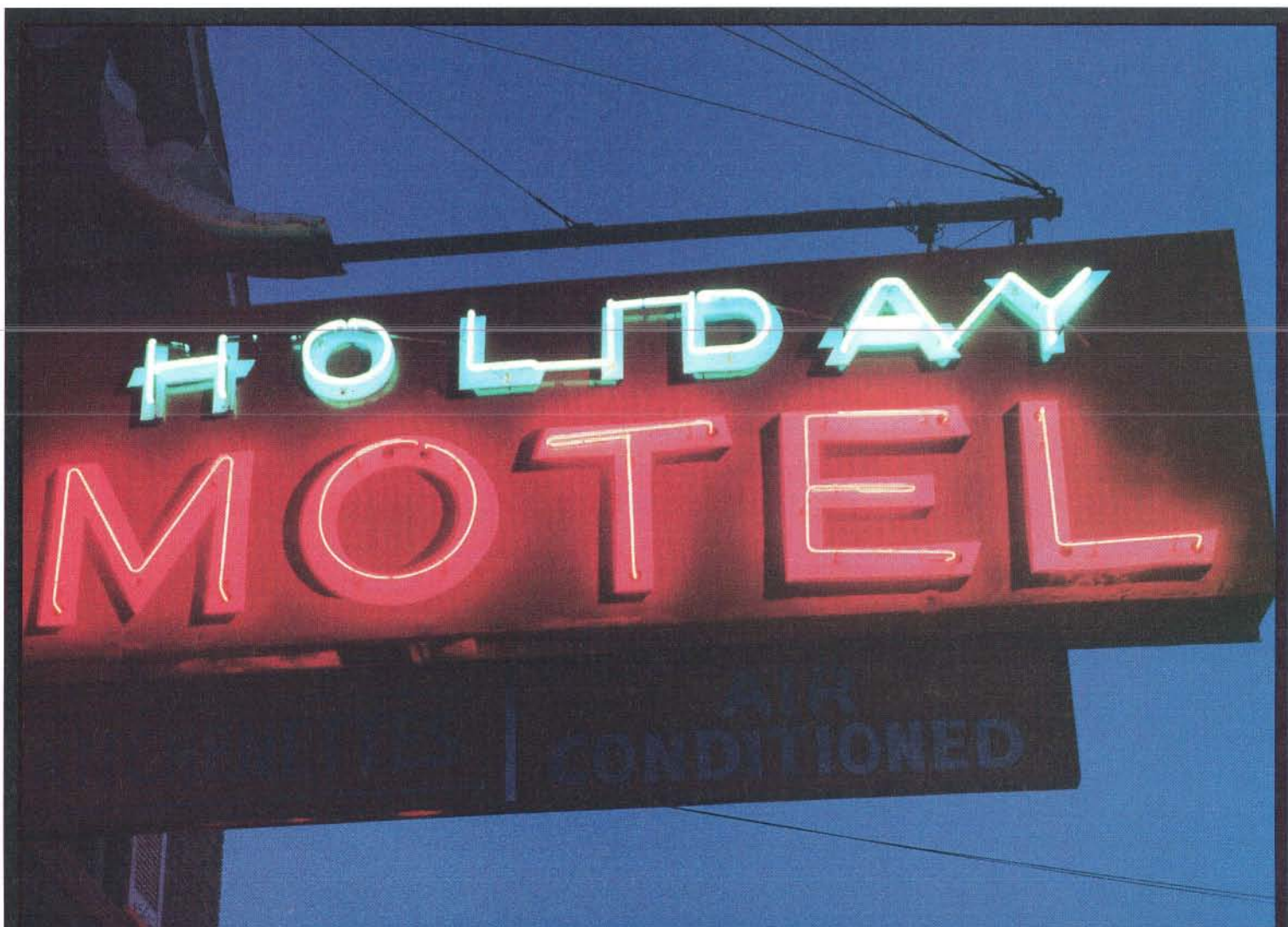
If parents spend time with their children, form strong attachments with them, teach them morals, live moral lives, discourage and punish immoral behavior, and treat their children in a moral way, then the moral issues their children face later are much more likely to be resolved.

As parents define permissible behavior and limits, as they explain them again and again, the child gradually incorporates these rules into her own reflexive behavior. This becomes the formation of conscience and individual value systems.

The idea that a TV show or a lyric can transform a healthy, connected, grounded child into a dangerous monster is absurd, an irrational affront not only to science but to common sense and to what we know about children in our own lives. It is primarily the invention of politicians

ple who have, or are battling for, some control over their lives.

- ★ Children have the right to be respected, to be accorded the same sensitivity that other disenfranchised minorities have grudgingly been granted by the rest of society. They should not be viewed as property or as helpless to participate in the decisions affecting their lives.
- ★ Children should not be branded ignorant or inadequate because their educational, cultural, or social agenda is different from that of previous generations. They have the right to help redefine what education, literacy, and civic-mindedness are.
- ★ Children have a right to two-way communications with the politicians, clergy, and educational leaders who claim to know what is best for them. Children have a right to help shape discussions about their moral lives.
- ★ Children of various socioeconomic levels ought to have equal exposure to the new technologies – multimedia, cable channels, the Net – that deliver information, education, and culture. They have a right to have new media and technology included in



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◀ 166 friends can circumvent almost all censorious technology, and since much of the digital world is beyond the comprehension of most parents anyway, mere authority becomes limited, sometimes meaningless. Children will learn not how to form value systems, but how their moral guardians can't make their dictums stick.

So, family members need to think through their own notions about children and culture. How much power and control are the elders willing to cede? A parent would spell out how much TV or online time he finds appropriate and define what else is expected from the child: domestic chores, school performance, religious obligations.

The child would spell out what access to culture she wants: which TV shows, which CDs, how much time online. And she has to specify what she's willing to do

With a Social Contract, families could begin to rely on trust and negotiation rather than phobias, conflict, and suspicion.

in exchange. She must agree to follow rules of safety: not giving out telephone numbers or home addresses to strangers online, and telling parents about "pornographic" contacts, such as files with sexual content. Media access is granted as a right, but it's subject to some conditions.

There would probably be as many different kinds of contracts as there are families. But if children meet their end of the Social Contract, then parents would concede that their children have a moral right to access the TV programs they want, the CDs they want to hear, the online services they choose and can afford. Families could begin to rely on trust, negotiation, and communication rather than phobias, conflict, and suspicion.

It has to be a good-faith contract. Parents who ask too much will lose their moral authority to make an arrangement like this. Kids willing to do too little will jeopardize it as well. Some parties will probably have to set aside their broken

contracts and keep on fighting.

Naturally, if either side violates its agreement – if kids fail in school, harm other people, start drinking heavily – then the contract is null and void. Children who can't or won't behave rationally forfeit the right to rational understandings and will return themselves to a state of diminished freedom.

But millions of American kids who can handle a racy chat room or an episode of *NYPD Blue* won't be denied cultural freedom because of their parents' fears about the kids who can't.

ARTICLE VII Test Case

As it happens, for years my own household has operated under a form of Social Contract – not that we called it that or thought much about John Locke. I have seen that it can work. My wife and I have a 14-year-old daughter, who is comfortable with my writing about her cultural

She can see virtually any movie she wants, although sometimes there is some discussion about it. If she is shocked, upset, or otherwise uncomfortable, she feels free to leave. The Motion Picture Association of America's parental rating system is an absurd guide to what children can or cannot handle and has never been the criterion in our family. When my daughter was younger, if there were serious questions about the violence, sexual content, or emotional intensity of a movie, my wife and I would sometimes see it first, then take our daughter. The ability to tell an 8-year-old when to close her eyes is a helpful thing. Now, of course, we don't have to.

She has been online since she was 10. We have never thought of acquiring blocking software, which would be offensive and demeaning to her, but she's been taught not to pass around her name, address, or phone number – and to pass problems or unsettling experiences on to us.

She hasn't had many. She has encountered occasional creeps and a few disturbed people online – boys who want to talk dirty, men who want to send her explicitly sexual files – and she's learned important phrases like No and Get lost. Despite the enormous publicity those kinds of contacts generate, they have been relatively rare. She does have online friendships, few of which I know anything about.

We trust her implicitly, until she provides a reason to be regarded differently. So far, so good: she does well in school, has healthy friendships, sings in a demanding chorale, has shown little interest in violence, drugs, or alcohol. She's developed a high level of common sense and analytic thoughtfulness about the culture she uses. But new media haven't supplanted old – she reads a lot, and writes, and talks. In fact, it was she, I hereby acknowledge, who first pointed out to me that my thoughts about children's rights related directly to this John Locke guy she'd learned about in her history class.

I have no illusions that she is a "typical" child, if there is such a thing. As an only child, she's easier to monitor. As a middle-class family, we can provide a computer, books, and an allowance high enough to cover movie tickets.



rights, though not about other details of her personal life.

Believing that culture is the language and currency of her generation, we've always encouraged her to understand it. She played Nintendo, watched cable, loved the *Teenage Mutant Ninja Turtles*. Now, she watches *ER*, *Homicide: Life on the Street*, and *The X-Files*, plus old musicals on cable and the occasional dumb sitcom after a tough week.

Kids

◀ 168 Still, she – and we – live very much according to Locke's idea of a Social Contract. It is understood and articulated that as long as she does as well as she's doing, she has the right to her culture and to her own rational judgments about it without interference, ridicule, or censorship.

We all understand that she needs to be different from us. Her culture is perhaps the most important way she has of separating, of differentiating herself from us.

So far, the contract holds.

ARTICLE VIII

The Political Power of Children

Cultural conservatives, politicians, parents, teachers, adults in general – and especially journalists – have greatly underestimated just how political an issue this assault on kids' culture has become.

The digital world seems willing to trade kids' rights for adults' freedom of expression. Don't take us, take our kids.

In topics online, on Web sites, in countless live chats, the young vent their anger at the pious efforts of the adult world to "safeguard" them, at congressional efforts to legislate "decency" on the Internet, and to curb free speech in this freest of environments. They're generating email, firing up online discussions, bordering Web pages in black.

This is as intensely aroused and political as kids have been since the '70s. Plus this digital generation has an organizational weapon no previous generation had: the ability to find and talk to distant allies just a modem away. Easily able to measure their own lives against others, to compare their own experience with rhetoric, these kids know their culture isn't dangerous. Their tactics, occurring almost completely out of sight of parents and beyond the consciousness of journalists and politicians, could transform the politics of the young.

Journalists have underreported the

extent to which culture is politics to young people, and how they resent suggestions that culture is rendering them stupid, indifferent, and violence-prone. Since children are almost voiceless in media and in the political debates on issues affecting them, it's not surprising that their outrage goes largely unnoticed.

But the traditional, hidebound press is learning the high cost of relentlessly patronizing and offending kids – it has alarmingly few young consumers. Politicians may soon be learning the same lesson. The battles over new media are likely to spark youthful politicization reminiscent of the movements launched by racial minorities, women, and gays.

Under the noses of their guardians, the young are now linked to one another all over the world. They already share their culture online, trading information about new movies, TV shows, and CDs, warning one another about viruses, sharing software and tech tips. At times, they band

together to chastise or drive out aggressive, obnoxious, or irresponsible digital peers. They steer one another to interesting Web sites.

But children, perhaps more than any other oppressed minority, have a long way to go to become politically organized. And they can't engage in political struggle by themselves.

By now, they should have had some help. Some online benefactor should fund something like a Children's Digital Freedom Center, similar to the Electronic Frontier Foundation. It could provide children with truthful information about violence, pornography, and online safety with which they could educate their classmates and confront ignorance and misinformation about their youth culture. It could also provide legal support to young people penalized for free expression online, or those unfairly denied their right of access to culture.

Instead, what children have received

from the digital community is a deafening yawn.

ARTICLE IX

The Hypocrisy of the Digital World

Above almost all things, the digital culture prides itself on the notion that information should be free, that this new culture should remain unfettered and unobstructed. Efforts at corporate and governmental control and the promotion of so-called "decency" standards are the subject of ferocious debate online and political lobbying offline.

But the culture is either silent or supportive of the attempts to block children's access. The EFF wholeheartedly supports limiting children's access to the Net and even has links from its Web site to publishers of blocking software. Even on libertarian-minded conferencing systems like The Well, it's mostly taken for granted that children can be denied the freedom of speech for which everyone else is so willing to fight.

Citizens of the Digital Nation, so quick to hit the barricades when Congress attempts to cut back on their freedom of speech, seem happy to embrace the new raft of blocking software. They seem quite willing to trade children's rights for their own freedom of expression. Don't take us, take our kids.

No one in the highly sensitive and politicized adult digital world blinks when the media cheerfully talk about blocking software as the clear alternative to censoring the Internet. No one minds when reviews recommend programs such as Cybersitter, SurfWatch, Net Nanny, and Cyber Patrol. The very names of the programs are patronizing and demeaning.

This approach is the antithesis of trust and rational discourse between adults and children and more evidence of the growing need to protect children not from smut, but from adult abuses of power. Blocking software is noxious and potentially unlimited. Some of these programs have thousands of potentially forbidden categories, going far beyond sex and violence. Once applied, censoring and restrictions inevitably will spread into other areas that adults want to place off-limits: political topics that differ ▶

Kids

◀ 169 from their own values, music and movie forums that don't conform to their adult tastes, online friends that don't meet their approval, Darwinian theory.

Although it's being introduced in America as a means of protecting children, as this technology evolves it could easily become the tyrant's best techno-pal, offering ever more ingenious ways to control speech and thought. Some children reared on this stuff will inevitably grow up thinking that the way to deal with topics we don't like is to block them – remove them from our vision and consciousness. In any other context, defenders of free speech would be bouncing off the walls.

Like the movie industry's silly ratings code, blocking software gives the illusion of control. It doesn't ensure safety since sophisticated evildoers will circumvent it even more quickly than kids. And it

It's time to extend to children the promise of the fundamental idea that Locke introduced to the world three centuries ago.

doesn't teach citizenship in the digital world.

As parents withdraw, secure in the belief that the Net Nanny will do the work they should be doing, count on this: children, many of whom helped build the digital culture, will swiftly transcend this software. They would be much better off if parents accompanied them when they first set out online, showing them what is inappropriate or dangerous.

Blocking deprives children of the opportunity to confront the realities of new culture: some of it is pornographic, violent, occasionally even dangerous. They need to master those situations in a rational, supervised way to learn how to truly protect themselves.

The urge to block presumes that exposure to certain topics is intrinsically dangerous. But only an infinitesimally small number of kids have been lured into potentially dangerous situations as a result of online encounters – fewer than

25, according to the National Center for Missing and Exploited Children. That's a tiny figure given the billions of online encounters.

The digital world owes it to children to defend their rights as zealously as it defends its own. So far, it has failed, betraying its own heritage and, worse, its future.

ARTICLE X What Children Need in the 21st Century

Children need to get their hands on the new machines. They need equal access to the technology of culture, research, and education. Poor and working-class families have few computers compared with the affluent middle class. And we are learning that some minority children are resisting computers as the toys of the white nerd.

But if new technology can create a gap between haves and have-nots, it can also narrow it. Cheap, portable PCTVs – televi-

sions with computers and cable modems – would help equalize the digital revolution in a hurry. Hastening the arrival of such equal access should be the first and most pressing moral issue of the digital generation.

Children also need to learn to use the machinery of culture safely and responsibly. That means grasping the new rules of community in the online world, transcending the often abrasive, pointlessly combative tone that permeates many online discussions. They need to learn how to research ideas and history as well as to chat, mouth off, and download games.

Children need help in becoming civic-minded citizens of the digital age, in figuring out how to use the machinery in the service of some broader social purpose than simple entertainment. They need guidance in managing their new ability to connect instantly with other cultures. They need reminders

about how to avoid the dangers of elitism and arrogance.

But more than anything else, it's time to extend to children the promise of the fundamental idea that Locke, Thomas Paine, Thomas Jefferson, and others introduced to the world three centuries ago: That everyone has rights. That everyone should be given as great a measure of freedom as possible. That all should get the opportunity to rise to the outer limits of their potential.

We need to teach ourselves how to trust children to make rational judgments about their own safety. We see their world as a dark and dangerous place, even as they see it as challenging, entertaining, and exciting. We patronize them in the belief that they don't have the character, common sense, or conscience to withstand the dangers of their vastly expanding cultural universe. And now we try to block them from that world.

We haven't got a chance. Like Locke's ideas of emancipation, children's lives are taking on a momentum of their own, moving rapidly past our anxious and fearful grasp. Their emancipation is as inevitable as our own.

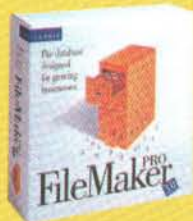
Since Locke's time, democracy has inexorably advanced as monarchies and authoritarian regimes have increasingly failed. They have been undermined by new ideas riding on the back of new technologies that now extend to every corner of the world. Oppressive authority and censorship seem increasingly anachronistic amidst the porous borders of the emerging digital era.

The approaching millennium is more than a historical landmark. It's the right time to liberate our children from the heavy hands of history. Most of us recognize that our children are moving into a miraculous new era. They will, like everyone else, take risks and face dangers. They will also reap great rewards.

Children have the chance to reinvent communications, culture, and community. To address the problems of the new world in new ways. To do better than we did. Instead of holding them back, we should be pushing them forward. Instead of shielding them, we should take them by the hands, guide them to the gates, and cheer them on. ■ ■ ■

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Voyager

◀ 131 Castle – and he said, ‘If you fast-forward through this, you’ll see the window never changes location.’ That’s true. Seven different shots and the light just dissolves, and you enter through that light.” With a laserdisc, you could move through the movie frame by frame, seeing not just what Welles had done, but *how* he’d done it. “Bob said, ‘This is what it’s about.’ And it clicked.” By the summer of 1985, with several hundred thousand dollars in capital, the Steins and the Janus team had founded Voyager, naming it after the space probe then headed for distant planets.

Aleen Stein recalls that at the beginning Voyager really did have an office in LA, but no one ever made it there, so they were soon running the company out of their house in Westwood. The division of labor was fairly fluid, but in essence Bob made the deals and oversaw production,

most visionary people in the multimedia world,” says Winter. “You say, ‘What multimedia world?’ because at that time there wasn’t one. And that’s exactly my point – Bob saw products where no one else did.”

Yet Stein’s vision was – and is – essentially old-fashioned: He wants to make books, but better. He wants to publish experiences that are deep enough for readers to return to again and again, whether in the hard-shell case of a laptop or the bendable cover of a paperback. “What’s great about books is that the power is in the hand of the user,” he says. “Books are random access – you can read a sentence twice or go back and look up a reference. Books are a user-driven medium versus a producer-driven medium like film. What we do is to transform a producer-driven medium into a user-driven one. The meta medium is that they’re all random access.”

Indeed, Stein’s vision has never been bounded by a single medium, which is

create a world and move through that world in a more interesting way.” Well, it’s only a matter of time, counters Stein; after all, just nine years ago he wrote the company’s first HyperCard program – a guide to a videodisc of the National Gallery of Art – on a piece of beta software that Apple had sent along. It was clunky, it was slow, you needed two monitors to use the damn thing – a black-and-white 9-inch for commands and a color video screen for the images from the disc. But it was multimedia.

By 1988, the company had about \$3 million in annual sales of its laserdiscs, and it had moved to a boxy former veterans hall on the beach in Santa Monica. For the first year, the Steins lived in the building. Their bedroom closet doubled as the sound booth. The environment was “high energy, anarchic,” says Nash, who ran the Criterion Collection from 1991 to 1993. “Anarchy reigned for lots of reasons, including philosophy. It was creative Darwinism.” Though sales grew to about \$9 million by 1990, the company never made it into the black. Undeterred, Stein pursued the CD-ROM format.

That year, while browsing in a bookstore, he came across a history textbook called *Who Built America?* Instantly he loved it, not only for its populism, but also for its design and integration of original documents and photographs. Lugging his Mac Classic and CD-ROM drive to New York, Stein made his pitch to the book’s authors, then spent about a year with them hammering out the conceptual details. When Apple gave the company a prerelease version of the PowerBook, a programmer grabbed it, put the first 10 pages of Paul Bowles’s *The Sheltering Sky* on a HyperCard stack, and loaded it onto the new machine – and Stein’s dream of an electronic book was suddenly concrete. To fund these experiments, the company borrowed and begged, getting \$480,000 in loans from The Markle Foundation and a \$500,000 check from Apple’s John Sculley, with which it did the history disc and the first line of Expanded Books.

If geography is politics writ physical, then the Santa Monica office was easy to read: Criterion was relegated to a balcony area, while CD-ROM producers had the main space, with a deck overlooking the

“What’s great about books is that the power is in the hand of the user,” says Stein.

while Aleen took care of day-to-day operations and did production work, and Turrell watched the finances from New York. (Bill Becker has always been the least directly involved of the partners.) Morgan Holly, Aleen’s son, ran errands and helped shrink-wrap the packages. Alita Holly, Aleen’s daughter, then a student at Columbia, handled sales in her spare time. Soon, there were 10 people working out of the house, with the Steins’ two youngest children, Murphy and Katie, underfoot. Desks were crammed into the bedrooms. When Voyager needed warehouse space, the Steins rented the house across the street. They had only one printer, so Morgan rigged up a LocalTalk cable between the two houses. At one point, there were so many young women running back and forth that the neighbors accused the Steins of running a brothel. Decisions were made by consensus, most often while sitting at the kitchen table.

Robert Winter, the UCLA music professor, met Stein back in 1982. Even then he was talking about the high-tech future. “I would count him at the time as one of the

where his reputation for both restless ingenuity and fleeting passion comes in. If it turned out that laserdiscs were good only for movies, he’d try CD-ROMs; if CD-ROMs were too slow and fixed to take on the major issues of the day, he’d use the Net. In between, there was a detour to what Voyager called Expanded Books, floppy-disk versions of paper-and-ink classics whose electronic pages look like books, act like books, and have the added ability to be searched, stored, and even paper-clipped.

“I’m a publisher,” Stein says. “I want to be where the great artists and writers of our day want to be. Laurie Anderson wants to do a CD-ROM, I’m there. Laurie Anderson wants to do a Web site, I’m there.” But by looking for bookness, some people think Stein may be overlooking multimedia’s true strength. With a few exceptions – Anderson’s *Puppet Motel*, The Residents’ *Freak Show* – Voyager discs are essentially translations, which, as Michael Nash, who produced the Residents disc for Voyager, points out, doesn’t take advantage of “the way that you can

Voyager

beach. "It's very hard to get Bob's time," says Mark Brem, who was a student at CalArts when he came to work on a laserdisc tour of Los Angeles for Voyager. The project took seven years to complete, and Brem became famous locally for living two years of that time in his VW bus. "QBT – Quality Bob Time – you could get only a minute of it if you weren't involved in something that was hot," he says. Increasingly, hot to Stein was CD-ROM. Morale wasn't helped much in the video-disc group when Stein began saying the format was dead. "Laserdiscs were dead," he says today, despite the reality that they are the only moneymaking sector of Voyager. Rather than back off his pronouncement, Stein adds, "It's like telling someone they have terminal cancer. It doesn't mean they're going to die tomorrow; it means they're going to die."

"Bob is an incredible starter. When Bob sees something he wants, he goes after it like no one I've ever known – artists, relationships," asserts Nash, who says he was "relentlessly recruited" by Stein out of the museum world. "But he blows follow-up." Mark Patricof, who gave up a six-figure salary at Creative Artists Agency to work for Voyager and whose sensibility is decidedly more entertainment oriented than Stein's, left in frustration after just a year to start KPE, his own multimedia company with another ex-Voyagerite, Trevor Kaufman. "Seductive?" says Patricof. "Absolutely. He's got a way of batting his eyelashes and preaching how honest he is, how artistic he is. But he's totally inconsistent. Bob's biggest flaw is that he loses interest very quickly."

Jonathan Turrell puts it a little differently: "We have this feeling that if we get our fingers in lots of different things maybe one of them will take off. So we don't necessarily put the concentrated effort into finishing what we start."

One consequence has been that Voyager put out 70 Expanded Books for the Mac, from Michael Crichton's *Jurassic Park* to Oscar Wilde's *The Picture of Dorian Gray*, and even licensed its book engine to publishing houses such as HarperCollins and Random House, yet sales never really took off (*Jurassic Park* hit

only the 10,000-copy range). Voyager lacked the technical prowess to write a Windows engine for the books, and it ended up largely abandoning the Expanded Books project, moving on to newer frontiers. (One programmer is now working on writing a Windows engine; no new Mac titles have been released.) Likewise, Voyager has been slow to port its CD-ROM titles to Windows. *Who Built America?* for Windows came out just last month, and a Windows version of *Puppet Motel*, originally released for Mac in the spring of 1995, is only now being created.

Stein readily admits to most of the failings others pin on him. The only difference is he tends to see them as strengths. When asked why Voyager has done such a poor job of pushing the technical side of its business, and why the company has only two in-house programmers for its CD-ROM titles, he says simply, "I'd rather hire an editor than a programmer. The job

"Bob is an incredible starter," says a former employee. "But he blows follow-up."

of publishing is to bring out a diverse list, and there's a quantitative aspect to that diversity. The guys who are high-tech will put out two or three titles. That's not interesting to me." Or take his insistence that Voyager hold onto its own distribution, which nearly everyone cites as the company's single biggest earnings problem – CD-ROM distribution requires a wide network of relationships, something it's tough for a small company like Voyager to develop. And in the software channel there are steep co-op charges that amount to publishers buying shelf space, a game Voyager can't play. So wasn't going it alone a mistake? "We haven't succeeded," Stein admits. "But if we gave it up there'd be no possibility of succeeding. It's the one really, really, really, really smart thing we've done." Giving up distribution would have meant giving someone else control over which Voyager titles got to market. "We couldn't have done *Mumia*, we couldn't have done *Who Built America?* if we'd given up distribution. Can you imagine Brøderbund distributing *Mumia*? Not that they're

against it, they just wouldn't have known what to do with it." (As it turns out, Voyager recently signed distribution deals with Holt and Rykodisc for the software and music channels, respectively.)

OK. Why do people who know Stein volunteer that he has a talent for self-marginalization? He considers the thought. "My goal is actually to be at the center," he says. "But when you have no money and your tastes don't run to the center, how do you get there? The integrity of the company is one of the only things we've got. So it's not so much that I want to be on the outside, it's that I'm trying to make a situation where the center pulls us in."

"And if over the next several years the general level of ideological struggle – political struggle – becomes more central to people's daily lives, we'll be pretty well positioned. People will come there. But that's going to come because we were willing to be in the margin for 12 years."

Then we can be in the center on *our* terms. And that's really the issue."

Stein freely admits that Voyager is not nearly there yet. "We have not yet had the kind of hits required that can build the financial engine that makes it possible." He compares Voyager to the Random House imprint Pantheon – "long on influence, short on sales." But he adds that his ultimate vision is to be another Random House proper. "I absolutely don't want to be a small press. I want to be a major press. We just don't want to get there by doing Joan Collins. Which makes for a much, much slower build. But" – and here Stein pauses again – "I'm real patient."

How patient can he afford to be? Stein says that between the production cutbacks and some minor dealmaking, the company has been put on a break-even course through the end of 1996. By resorting to its usual beg-and-borrow practices, it's even been able to restore some projects: the Rockefeller Foundation put up \$75,000 for a project on African-American artist Betye Saar, and an unnamed investor is underwriting 174 ▶

Voyager

◀ 173 a disc of the art-world provocateurs the Guerrilla Girls. But that still doesn't put Voyager at the cultural center. "We need some breaks," Stein allows.

Another afternoon. Stein and I are sitting in his office overlooking lower Broadway. Just beyond the three-quarter walls sit 22-year-olds staring intently into the screens of their Macs. ("If you're over 30 at Voyager," says someone who is, "you feel like a camp counselor.") Stein's computer, like everyone else's, sits on a folding table, though his office seems a bit more permanent than most: the walls bear a few mementos, among them a poster celebrating the 100th anniversary of the birth of Mao Tse-tung.

Stein is revisiting the protracted fallout with Aleen (who, incidentally, is looking to unload her 20 percent of the company for around \$7 million). Turrell has recalled of

chosen someone to handle the job.

Voyager staffers soon found themselves caught up in an absurd race, with California and SoHo competing to be the first to go live. One morning early in January 1995, when the SoHo site was still weeks from completion, an email message arrived from Alita. "The Web site is up," it announced. Furious, Bob demanded that the site come down. Aleen, who was in New York between the MacWorld and Milia conferences, refused to force Alita to kill it. So Bob gave Alita an ultimatum: dismantle it at once or you're fired. She didn't and she was. A final showdown among the partners was unavoidable. Bob proposed what he saw as an equitable solution: Voyager should form an executive committee, which would make the management decisions, thereby diffusing decisionmaking beyond the four partners. They would all agree to abide by its rulings. But Aleen refused to go along. She saw the committee as

ects, including a series called The Narrative Corpse – featuring artists like Art Spiegelman and Julie Doucet – for which it charged a \$3 subscription. (According to Stein, several hundred people registered.) By April he had announced ambitious plans to turn the company into a "Webcaster," starting with a real-time *Late Night with Laurie Anderson* show to debut this summer.

Many people believe the CD-ROM market will eventually move decisively into bookstores – playing to Voyager's backlist strength. Can Voyager hang on that long? If you don't have money, make a virtue of its lack, Stein responds. He proposes that potential investors should value Voyager for its contributions to digital culture, not for its P/E ratio. He proposes thinking of the company as a kind of "D group" for the whole industry, worth supporting because of the things it's done for the public's perception of multimedia and the inspiration it's given to other companies.

But can Voyager function as a business?

"My instincts tell me we are so weak financially that our maneuvering room is not what it needs to be," Stein says without emotion. "One of three things will happen: We'll keep going along as we are for a number of years, getting increasingly weaker; we'll find some strategic partner and have another period of growth and influence; or we'll end up selling."

One thing is sure, if Voyager's track record is any guide: Stein will always find ways to spend whatever money becomes available. "If it were a \$100 million business, he'd have enough ideas to spend the \$100 million," observes investment adviser Koblenz. "Almost by definition, they're going to live continually at the edge." That, combined with Stein's ingrained reluctance to cede control, makes it difficult to imagine a new investor buying a stake in Voyager.

But Stein himself is not overly preoccupied with the possible scenarios for Voyager's future. He would rather address, with a burst of enthusiasm and interest, his plans for Voyager on the Web: "I'm a browser, and for me being on the Web is exactly like being in a bookstore – browsing the stacks, picking up things. I love the Web." ■ ■ ■

By April, Stein had announced ambitious plans to turn the company into a "Webcaster."

this unhappy time that "Voyager was going to die – the company was in total chaos." In 1992, Aleen had moved to Paris to set up an international sales and marketing office. The following year the company moved east from LA, with Stein settling in SoHo and Turrell opening the Irvington office, where the technical crew led by Morgan Holly was also installed. Cash was, as usual, tight, and to the New York partners the money they were spending on the Paris office seemed an unnecessary luxury. But Aleen was adamant; she had a vision for Voyager in Europe.

As often happens in divorce, the final battle was forced by a side issue: Voyager's presence on the Web. By the fall of 1994, Aleen's daughter Alita was commuting between New York and San Francisco, where she set up a staff to develop a Voyager International Web site. Alita says that after her team began working, Stein decided to create the Voyager Web site out of SoHo. "The battle was drawn by Bob," she says. "It was part of the end-game at Voyager." Stein says he'd told Alita his plans and that he had already

a ploy for Bob to get his way. Over her objections, and in her absence, the Voyager board – for the first time ever – took a vote. Aleen was removed and the executive committee created.

That afternoon, Bob perched on a tabletop in the conference room and told the staff what had happened. He seemed sorrowful, resigned. Aleen was agitated, close to tears. This is a horrible sham, she broke in. Don't believe anything you're about to hear. The executive committee is a kangaroo court and – in a rush of words – *you're next, watch your back, if they can push me out they can push anybody out.* Before she walked out, Aleen told the crowd one more thing: "This company will never be the same."

As it happens, that's fine with Bob Stein, who is in the midst of a heady flirtation with the World Wide Web. The way he sees it, the Web is the perfect outlet for a company whose money woes relegate it, at least for now, to the realm of a quick and cheap aesthetic. The company has launched a number of Web-based proj-

Koolhaas

◀ 132 **thinking anyway, you might as well think big."**

[Laughs.] That's also part of it.

Are you thinking Bigness on the MCA project?

There is an enormous, deliberate, and – I think – healthy discrepancy between what I write and what I do.

additions to the canon. In that sense, Universal is fundamentally different from a place like Disney, where a fixed repertoire of ancient inventions is endlessly, morosely recycled. This project has to, and can, symbolize real vitality, real creativity.

For a long time, you didn't believe that building was the necessary outcome of designing, and in fact you've built only about 20 projects so far.

miscalculations of projects.

The most romantic example of this is the story you tell about a house that the young Mies van der Rohe was commissioned by a wealthy woman to build. After having him design and construct a 1:1 scale model in canvas she abandoned the project. The story seemed to make a deep impression on you: "I suddenly saw him *inside* the colossal volume, a cubic tent vastly lighter and more suggestive than the somber and classical architecture it attempted to embody. I guessed – almost with envy – that this strange 'enactment' of a future house had drastically changed him ... was this canvas cathedral an acute flash-forward to another architecture?"

Yes! The impact on me was in the fact that the "cancellation" of the house was more dramatic, more important almost, than its realization. It's a sensation that later, as an architect, I became intimately familiar with. **If "the culture of the 20th century is the culture of congestion," what will the culture of the 21st be?**

The culture of dissemination, dispersal. ■ ■ ■

People can inhabit anything. And they can be miserable in anything and ecstatic in anything.

Do you have an idea of how the project will develop?

It's too early to say, but what interests me is that Universal City is a site of production – films are actually being made there – and of consumption – a vast theme park, hotels, et cetera. The "work" legitimizes the "pleasure." And since moviemaking is the driving theme, there is the suggestion of ever new

S,M,L,XL is deliberately seamless about this, trying to present an absolute equivalence between unbuilt and built, because in a way I think it's a moot point. Of course, it can be very inspiring to build things. But part of the goal of the book was to explore architecture that didn't come to fruition. I was also interested in showing the implications of failure – showing both the calculations and the

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Aum

◀ 137 this more true than in the schools.

Studies dominate the life of young Japanese. Students spend 240 days at school each year – a third longer than their American counterparts. Late afternoons are spent at cram schools, working to pass the examinations that begin in kindergarten. Nights are spent doing homework. The system has helped breed a generation of nerds, of technically literate, highly knowledgeable young people who lack basic social skills and have little understanding of the outside world.

If the schools don't drive you into your own mind, the environment does. In a land where urbanization knows few bounds, where homes and offices are torn down in endless succession, the only land most Japanese know is the growing sprawl of the megalopolis. Mile after mile the cities of Japan go on, a relentless, urban sea of power lines, roads, and uninspired buildings of steel and concrete. There are crowds seemingly everywhere, on the trains, the streets,

alienated, but the very bright and very talented. By 1989, remarkably, Asahara had gathered around him some of the finest young minds in all Japan – chemists, biologists, doctors, computer programmers. The high-tech children of postindustrial Japan were fascinated by Aum's dramatic claims to supernatural power, its warnings of an apocalyptic future, its esoteric spiritualism.

There was Seiichi Endo, 28, who left prestigious Kyoto University, where he did experiments in genetic engineering at the medical school's Viral Research Center. Another, Masami Tsuchiya, 24, a first-rate graduate student at the University of Tsukuba, abandoned cutting-edge work in organic chemistry to join the cult. Fumihiro Joyu, 26, arrived with an advanced degree in telecommunications from Waseda University, another leading school, where he studied artificial intelligence. Joyu had gone to work at the National Space Development Agency of Japan, but resigned after only two weeks. "The job," he told stunned officials, "is incompatible with my interests in yoga."

So they came. Not just the alienated, but the very bright and very talented – some of the finest young minds in all Japan.

the highways. In an area the same size as California are crammed more than four times as many people.

One can understand why, then, the Japanese say they prefer to cultivate inner space – the inside of their homes, the inside of their minds. And Aum offered the ultimate inner space, one that would take its followers on a direct line to outer space. "Aum members lived in a purely imaginary world," observed Shoko Egawa, a journalist who followed the cult for years. "One that combined primeval fear with a computer controlled, cartoon version of reality." Adds another Aum-watcher, "It was virtual reality made real."

So they came. Not just the curious and

And then there was Hideo Murai, the astrophysicist. Brilliant, intense, and soft-spoken, Murai would become the chief scientist of Aum and engineer of the apocalypse. A quiet kid who enjoyed bicycling and science, he won acceptance to prestigious Osaka University, where he earned an advanced degree in astrophysics from its highly competitive Graduate School of Science. There, he studied the X-ray emissions of celestial bodies and proved a whiz at computer programming. On graduation, he joined Kobe Steel, a ¥1.1 trillion (US\$10.5 billion)-a-year conglomerate with interests in metals, machinery, electronics, and biotech. Murai worked in the firm's R&D section, running experiments to make steel supermalleable, like hot caramel. Interesting work for the young physicist, but not terribly fulfilling.

After two years at Kobe Steel, Murai's behavior began to change. While browsing through a bookstore, he had picked up an Aum publication on yoga and ESP, and he was hooked. He spoke to colleagues at work

about how levitation and telepathy might be possible and lost interest in his career. For his wedding, he brought his fiancée not to Hawaii, as do many Japanese men, but to Nepal. On his return, Murai announced to all that he was quitting the company to devote himself fully to Aum and his new spiritual life.

Murai's parents tried desperately to talk him out of it. But their son simply handed them a copy of *Jonathan Livingston Seagull*, the onetime best-seller about a seagull's struggle to learn to fly. The novel, he told them, expressed his true feelings. ("I hate that book," his mother later said.)

Murai thrived inside Aum. He devoured Asahara's teachings and became a prize disciple. So ascetic was Murai's life that he moved permanently into a tiny cell used for meditation. "This room is very small and dark for those who want to escape," he once said. "But if one wants to meditate, it is as big as the universe."

The 30-year-old Murai was the senior scientist at the cult, and Asahara looked upon him with growing favor. Murai and the others had ideas about how to push forward Asahara's ideas, using the tools and techniques of modern science. There were ways to analyze the unique qualities of their guru's blood and brain waves, Murai explained. And there were technologies the cult could use to protect itself from the coming dark age.

Murai and the other scientists lent chilling detail to Asahara's vision of an apocalyptic future. The guru was fascinated as his young brain trust talked of fantastic weapons that would hasten the world's end: lasers and particle beams, chemical and biological agents, new generations of nuclear bombs. The land would be laid to waste as never before, they assured their leader.

For Hideo Murai, the astrophysicist, he at last had found a place in the world. What he heard from his master's voice fit perfectly with his own thoughts of the universe. Indeed, all this had been predicted before, he told the others. Far more important than *Jonathan Livingston Seagull* was another work by an American writer. And this man's books would serve as the master plan for the scientists of Aum.

PLANET TRANTOR

"The Empire will vanish and all its good with it. Its accumulated knowledge will decay and the order it has imposed will vanish.

David E. Kaplan is an investigative reporter and editor who specializes in Asia and the Pacific. He's the author of Yakuza, a book on the Japanese Mafia. Andrew Marshall is chief Asia contributor for British Esquire. You can reach them through the book's Web site at www.lainet.com/~kaplan/.

Aum

"It could be Shoko Asahara talking. But it is Hari Seldon, a science fiction figure 10,000 years in the future. Seldon is the key character in the *Foundation* series – Isaac Asimov's classic sci-fi epic – and he would give Murai and Aum their high-tech blueprint for the millennium and beyond.

Seldon is a brilliant mathematician who discovers "psychohistory," the science of true prediction, and warns that the galactic empire will fall into ruin for a thousand generations. "Interstellar wars will be endless," Seldon tells a skeptical but threatened government. "Interstellar trade will decay; population will decline; worlds will lose touch with the main body of the Galaxy."

The empire fails to heed his warnings, prompting Seldon to take matters into his own hands. Asimov's core trilogy, written in the 1940s, depicts his hero's efforts to save humanity by forming a secret society that can rebuild civilization in a single millennium, instead of the 30,000 years they face.

At the center of Asimov's universe lies Trantor, the ruling planet of an empire that spans 25 million worlds across the galaxy. Trantor is a planet of 40 billion souls that, writes Asimov, holds "the densest and richest clot of humanity the race had ever seen." The surface of the planet comprises a single, vast megalopolis, extending a mile deep into the ground in an endless, mind-boggling labyrinth of humanity. Nature has long since disappeared, replaced by the sight of gray metal protruding skyward and delving deep underground. All that remains of the natural world is the emperor's palace, an island of trees and flowers amid the sea of a planetary city.

It is not hard to see the parallels between Trantor and modern Japan, right down to the leafy grounds of the emperor's palace that stand in central Tokyo. For years, in fact, Japanese engineers have worked at developing what they call "superdepth construction," with plans to build the world's first underground city by 2020.

The coincidences could not have escaped Hideo Murai as he read a Japanese-language copy of *Foundation*. But the similarities did not end there. In *Foundation*, Hari Seldon gathers the best minds of his time – scientists, historians, technologists – and, like

monks in the Middle Ages, sets about preserving the knowledge of the universe. Seldon, however, has in mind no less than controlling the future.

Hari Seldon dies, but true to his predictions the empire falls into chaos. To survive, Seldon's secret society (the Foundation) transforms itself into – what else? – a religion. His followers create a hierarchy of scientist-priests whom the rest of the galaxy, having lost the command of science and technology, look upon as wizards and holy ones. "The religion we have is our all-important instrument," explained one follower. "It is the most potent device known with which to control men and worlds."

The similarities to Aum and its guru's quest were remarkable. Aum's central mission seemed a mirror image of the Foundation's struggle to save humanity. "If Aum tries hard, we can reduce the victims of Armageddon to a fourth of the world's population," Asahara had preached. "However, at present, my rescue plan is totally delayed. The rate of survivors is getting smaller and smaller."

Aum was using Asimov's *Foundation* sci-fi series as the blueprint for the cult's long-term plans to save humanity.

In an interview, Murai would state matter-of-factly that Aum was using the *Foundation* series as the blueprint for the cult's long-term plans. He gave the impression of "a graduate student who had read too many science fiction novels," remembered one reporter. But it was real enough to the cult. Shoko Asahara, the blind and bearded guru from Japan, had become Hari Seldon, and Aum Supreme Truth was the Foundation.

BRAIN WAVES

"We have a new initiation," said the cult doctor. "Please drink this."

It was September 1994, and Dr. Ikuo Hayashi was experimenting. A cardiovascular surgeon, the 48-year-old Hayashi had joined Aum after nearly killing a mother and daughter in a car accident. With his anesthesiologist wife and a dozen cult doctors and nurses, Hayashi presided over a horror shop of human testing, drugging, and crackpot medicine.

The victim this time was a Japanese army

veteran, a 25-year-old personal bodyguard for Asahara. Hayashi had summoned the cult member and handed him a glass used for urine samples. Inside was a yellow liquid. "Soon I got dizzy and was knocked out," the man recalled. "When I came to, I was on a bed and didn't know what was going on. It seemed many days had passed, but I had no memory. When I touched my head, there were swollen spots – they were so painful both inside and outside my head. It was a dull, aching pain."

The "spots" were in fact surgical incisions, made at four points in the man's skull – one at each temple and two in the back. Each cut was 1 centimeter long and 2 centimeters wide. Fresh scars and swelling bald spots showed through what was left of his hair.

The man was later rescued and nursed back to health. "When I went home I had a thorough exam of my brain," he said. "But a CAT scan showed nothing. As for the four scars ... I think they might have put electrodes in my head."

"Electrodes in my head" – the phrase

echoes, as if from some distant retrograde future. Aum, the high-tech death cult, had met the cyberpunk world of *Neuromancer*, William Gibson's science fiction classic. In Gibson's book, a "console cowboy" called Case prowls the holographic backstreets of Tokyo and wires his mind directly onto computer nets. He might have felt right at home inside Aum's laboratories.

Aum's scientists were fascinated by electronics and the brain. Their main focus, though, was not so much in logging on, but in locking up – in finding new ways to achieve mind control. Dogma, drugs, and brainwashing apparently were not enough to keep Asahara's legions in line. What Asahara really wanted to create was a realm of zombies.

Brain wave patterns had always interested Aum's scientists. These were, after all, the basis of the electrode caps worn by the cult priesthood. But the scope of their experiments expanded radically. One set of tests performed by Dr. Hayashi used electric 178 ►

Aum

◀ 177 shocks to wipe the memories of suspicious followers. According to Hayashi's detailed medical records, 7 shocks of 100 volts each, delivered to the scalp, were enough to blank the short-term memory of one of Asahara's drivers, who had been branded a spy. The man couldn't remember he had ever driven the guru's car.

A worker at the compound who tried to escape received 11 shocks, while a male follower accused of sexual relations got 19. During one three-month period beginning in October 1994, Dr. Hayashi administered more than 600 electric shocks to 130 followers. Afterward, some of them forgot which cult they were in, what the guru was called, even their own names.

BODY SNATCHERS

Like *Invasion of the Body Snatchers*, the classic 1950s sci-fi film, Aum's insidious influence seemed to reach into every corner of society. The cult reportedly counted among

enlisted in Asahara's army – plus another 60 or so veterans. One member at the National Defense Academy slept under a large poster of Shoko Asahara and vowed to recruit others before graduation. Even more helpful was a first lieutenant in Japan's second Antitank Helicopter Unit who leaked reams of classified data to the cult.

When infiltration failed to get what Aum wanted, the cult turned increasingly to wiretapping. Like biochemical technology, the tools to conduct electronic eavesdropping are now within the reach of everyday people – and Aum took full advantage. The first tap had been discovered as early as 1991 by NTT, the national phone company. Aum's technique was simple enough. It reportedly obtained NTT uniforms and ID badges, and put together a tapping manual for its security and recruiting teams. Favorite targets were rich potential donors and Aum enemies. Opponents claim at least seven wiretaps were found in homes belonging to relatives and others opposed to the cult.

It was the police that most occupied the

produce 1,000 Russian machine guns and tons of TNT. All this would enable Aum to survive apocalypse and inherit the Earth.

In cult publications and radio broadcasts, Aum experts described in macabre detail the weapons of the future and how their followers alone would survive Armageddon. Murai spoke admirably of the plasma cannon, which concentrates microwaves into a single beam of 4,000 degrees centigrade. The weapon burns away living tissue while leaving structures intact. Such a weapon has been researched by the Pentagon, but Murai claimed the Americans had already deployed it in the Gulf War, evaporating Iraqi soldiers by the thousands. That was why, he said, only 8,000 bodies were found, while Iraq claimed it had lost 100,000.

Murai also claimed the superheroes of Aum would survive this devastating attack. "Enlightened believers produce an electromagnetic field," Murai explained. "When the plasma from outside affects your body, you can take it as your own energy, and you will be more powerful."

Another "ultimate" weapon was the "fixed-star reflection cannon," which Aum swore Russia was then developing. A stationary satellite focuses solar energy onto an Earthbound target. The intense heat melts everything in its path – except Aum believers. "Enlightened believers can separate their bodily senses from their consciousness," an Aum text explained. "So they can withstand the high heat that would burn ordinary people. That's why they have been trained by submerging for 15 minutes in hot water of 50 degrees centigrade (122 degrees Fahrenheit)."

Like the indestructible comic-book heroes of their youth, Aum followers believed that they alone would rise from the ashes of Armageddon. Then, as Asahara prophesied, they would build the millennial Kingdom of Aum. But what would the kingdom look like? How would it be governed?

Endowed with superpowers, armed with weapons of mass destruction, Aum lacked only one thing: a state. In the summer of 1994, Asahara ordered a sweeping reorganization, setting up the cult as a shadow government. At least on paper, Aum now resembled a cross between a medieval theocracy and postwar Japan. A constitution was drafted, spelling out the structure of the new nation and the duties of its subjects. 180 ▶

Aum scientists built an automated plant to mass-produce sarin, the Nazi nerve gas that would prove their weapon of choice.

its flock as many as 40 young bureaucrats from Japan's top ministries – education, post and telecommunications, justice, construction, transport – plus tax collectors and regional judges. One judge was said to have donated ¥1 million (US\$9,505) to the cult. There were also reporters and editors, including a program director at NHK, the national broadcaster.

Aum's membership list also included more than 100 experts in engineering, communications, computing, and other fields from companies like Toshiba, Hitachi, and IBM Japan – all high-tech firms whose state-of-the-art technologies Aum coveted. Some eventually left their firms to join the cult full time; others merely donated large sums of money. There were also those considered "sleepers" – nonmembers who perhaps only attended yoga classes but could, with the right plan, be recruited into the cult.

Aum's tentacles reached deep into the Japanese military. Nearly 40 active duty members of the Self Defense Force had

minds of top Aum officials. Fortunately for Aum, its recruiting had paid off here, too – at least a half-dozen members of Japan's finest had joined up. One top official admitted that two of them belonged to the Tokyo Metropolitan Police Department, widely considered the elite of Japanese law enforcement.

SHADOW GOVERNMENT

Infiltrating the Japanese establishment was not enough – Aum needed arms for Armageddon. The cult, now endowed with millions of tax-free dollars, launched crash programs to develop weapons of mass destruction. Aum's scientists had built a vast automated plant to mass-produce sarin, the Nazi nerve gas that would prove their weapon of choice. Others worked on synthesizing mustard gas, VX, and other chemical killers. In cult biolabs equipped with the latest gear, technicians cultured agents that cause anthrax, Q-fever, and botulism. At the same time, assembly lines were set up to



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Aum

◀ 178 Citizens, for example, "shall be liable to military service in order to protect the sacred law."

To govern the republic, Aum set up 24 ministries that eerily reflected the Japanese state its members were so eager to destroy. The cult's chief scientist, Murai, became minister of science and technology. The other appointments were not without irony. Kiyohide Hayakawa, the engineer intent on giving Aum the means of mass destruction, was made minister of construction. Microbiologist Seiichi Endo, who spent his time culturing bacterial weapons, rose to minister of health and welfare.

Aum Supreme Truth, of course, was no democracy, nor was the state it sought to create. The millennial kingdom was from here on dubbed The Supreme State, leaving no doubt about who would inherit the world. And on top of the great empire, ruling serenely over the cosmos, sat Shoko Asahara, now deemed by law the Holy Monk Emperor.

The guru's laser passion was understandable. After all, what was a high-tech death cult without the classic death ray?

DEATH RAY

Next to Murai's Ministry of Science, no part of Aum was more vital to the cult than the Ministry of Intelligence and its 25-year-old chief, Yoshihiro Inoue. And no mission was more important to Inoue than the pilfering of sensitive data from Japan's top high-tech companies. To the enterprising Inoue, the Mitsubishi Heavy Industries compound in Hiroshima was a virtual library of classified military secrets. MHI designed tanks, escort ships, and nuclear power plants, and its Hiroshima facility was a technological gold mine – one that Inoue was about to plunder.

It was about 11:30 p.m. on December 28, 1994, a dead hour in the middle of the slow holiday season. While millions of Japanese lived it up at overseas resorts, Inoue's five-man team sped through MHI's front gate in a rental car. Sergeant Tatsuya Toyama, a member of an elite Japanese paratrooper unit, was at the wheel. Inoue sat beside him. There was another paratrooper in the back,

one more curled up in the trunk.

Also in the backseat sat cult member Hideo Nakamoto, a 38-year-old MHI senior researcher. Nakamoto had provided Inoue's squad with the MHI uniforms they now wore, and his company ID ensured an easy passage through the 24-hour security at MHI's gates. Once inside the compound, Toyama stood guard, swinging a flashlight. The others walked swiftly into the building.

Then the thieving began. Inoue's team logged onto MHI's mainframe and downloaded megabytes of restricted files onto a laptop computer. What they couldn't fit on disks was photocopied or simply pilfered. Among Inoue's loot was a description of laser sighting devices for tank guns, and a document – marked "Top Secret to Company Outsiders" – containing data on laser technology to enrich uranium. Afterward, Toyama helped carry cardboard boxes full of documents and disks out to the car. Then Inoue and his squad drove out the way they'd come in – through the front gate.

Breaking into MHI was so easy that Inoue

returned again – and again. The information he stole was funneled back to Aum scientists, injecting new energy into the sect's grandiose designs to develop a dazzling variety of futuristic weapons.

Chief among them was the laser, which Aum had been studying for several years. In fact, just two months before the MHI break-in, residents at Mount Fuji had witnessed a bizarre sight – a sharp beam of red light streaking across the night sky. It was 4 inches wide and emanated from one of Aum's buildings. For two hours, the beam was locked on to another sect facility about a mile away. Cultists later told locals that Aum was merely conducting a "laser irradiation experiment." The real reason was less reassuring. They were out to make laser weapons.

The cult's firearms factory had used laser cutters capable of slicing through iron plates since April 1994. But the guru had long been obsessed with the dark beauty of lasers. "I believe that in the end a giant laser gun will be developed," Asahara preached in

1993. "When the power of this laser is increased, a perfectly white belt, or sword, can be seen. This is the sword referred to in the Book of Revelation. This sword will destroy virtually all life." The guru's passion for lasers was easy to understand. After all, what was a high-tech death cult without the classic "death ray" seen in a thousand sci-fi movies?

During the Cold War, the US and the Soviet Union spent billions of dollars trying to create such a "death ray." With the guru's blessing, Aum was spending millions, too. But lasers were just one of myriad technologies preoccupying the sect's mad scientists. On one encrypted optical disk, they had compiled a wish list of cutting-edge research: studies on advanced liquid and gel explosives, blueprints of rocket ignitions, data on missile targeting systems for fighter jets – Aum wanted it all.

But while Aum prepared for Armageddon, the extraordinary happened – Armageddon came early. On January 17, 1995, an earthquake of awesome power struck Kobe in central Japan, toppling freeways, crumbling apartment blocks, and igniting a firestorm of destruction. More than 5,500 people perished in what became Japan's worst disaster since World War II.

For Asahara, the Kobe earthquake was stunning proof of the coming apocalypse. Aum's chief scientist Hideo Murai, however, did not believe the quake was an act of God. He was a scientist after all, and scientists have rational explanations.

"There is a strong possibility that the Kobe earthquake was activated by electromagnetic power or some other device that exerts energy into the ground," Murai later told an assembly of international reporters. This device, he added, was possibly operated by the US military. Murai's attempts to explain further were drowned out by derisive snorts from reporters. A device capable of triggering massive seismic movements sounded hopelessly sci-fi and far-fetched. But as it turned out, Aum wasn't the first to be fascinated by the idea.

"Nikratesura" is the closest Japanese rendering of Nikola Tesla (1856-1943), the brilliant Croatian-American who discovered alternating current and pioneered radio, the electric motor, and remote control. Tesla studied the possibility of transmitting electric energy over long distances by tak- 182 ►

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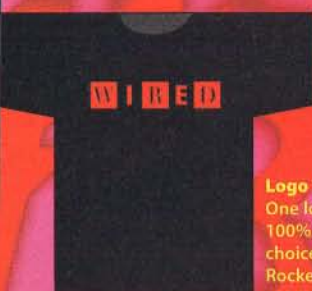
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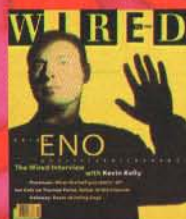
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Aum

◀ 180 ing advantage of electromagnetic waves emitted by Earth – in effect, using the planet as a giant, wireless conductor. In 1899 at Colorado Springs, Tesla lit hundreds of lamps about 40 kilometers away using a large induction coil, a device that produces an electric current by changing magnetic fields. He afterward claimed that the same method could in theory be used to send a signal through the Earth that could be picked up on the other side.

Nikola Tesla's remarkable mind led him to a field we now know as telegeodynamics. Here his theories grew extraordinary. He believed that by manipulating the Earth's electromagnetic forces, one could dramatically affect both climate and seismic activity; in other words, play god. Tesla warned that his discovery could split the planet in two – "split it as a boy would split an apple – and forever end the career of man."

Although many geologists dismiss this

York office contacted the International Tesla Society in the US, asking for information on Tesla's inventions, patents and writings. The Kobe tremor may have been an act of God. Hideo Murai was determined that Japan's next earthquake would be an act of Aum.

THE DEED

The hit squad drove out of Mount Fuji at sunset. There were five of them – one doctor and four vice ministers in the Science and Technology Ministry. The men chosen to unleash terror in the heart of Tokyo were among Aum's, and Japan's, brightest minds.

The first was Dr. Ikuo Hayashi. As the brains behind Aum's clinics, the good doctor had coldly presided over the wholesale doping, torture, and death of many followers. Still, he found it hard crossing the line from gross medical malpractice to mass murder, if later reports are to be believed. "I didn't know why I was chosen for the attack," Dr. Hayashi said. "I wanted to refuse, but the atmosphere didn't allow it."

Passengers tumbled from the train, gagging and vomiting. Others lay inside, their bodies jerking violently.

notion as comic-book nonsense, recent research has shown that earthquakes are preceded by unusual emissions of low-frequency electromagnetic waves, produced by small cracks in lower layers of plates in the Earth's crust. Tesla's ideas were in fact taken very seriously by both the US and Soviet militaries. Portions of the man's papers, seized by the US government after his death, remain classified even today. Some US experts reportedly believe the Soviets used a "seismic weapon" to trigger an earthquake in Beijing in 1977.

An earthquake machine! It's not hard to see why the idea excited Murai. He wanted to know more, and that's where the six members of the Japan Secret Nikola Tesla Association came in. A month after the Kobe quake, the members began a series of trips to the Tesla museum in Belgrade, where many of his papers reside. There they searched for data on seismology and electromagnetism. Meanwhile, the cult's New

Less likely to refuse the mission was the squad's second member, Yasuo Hayashi. The good doctor's namesake was a 6-foot-tall ethnic Korean who had grown up in Tokyo. Hayashi was a mean-looking 37-year-old with Neanderthal brows and a fur of acne on each cheek. His qualifications included an electrical engineering degree and a criminal record of substance abuse. His fascination with the supernatural had led him to India, then to drugs, and then to Aum. He became a monk in 1988, and proved adept at abduction, wiretapping, and intimidation. The subway attack would earn him a new nickname from Japan's media: "Killer Hayashi."

The next man, 30-year-old Kenichi Hirose, had graduated at the top of his class in applied physics from Waseda University in 1987. He turned down a job at a big electronics firm to join the cult, but often returned to the university to question his professor about laser research. The professor was baffled by Hirose's choice. "Floating in

the air violates the law of inertia," the professor once said, referring to Asahara's trick of appearing to levitate. "Why would a student of physics believe such an outrageous thing?" Hirose replied: "Because I saw it."

Masato Yokoyama, 31, was another graduate in applied physics. His classmates at Tokai University outside Tokyo remember him as a quiet student who dressed in prep-py clothes and enjoyed bowling. On graduation he joined an electronic parts maker and secretly attended Aum yoga classes. Then one day Yokoyama presented his boss with a cult book. "Please read this and study," he said. On the last page of the book, he had scribbled: "Those who handle this book carelessly will pay for it." Soon after, Yokoyama quit work and joined Aum – "to save mankind," he told his protesting family.

The fifth and final attacker was 27-year-old Toru Toyoda. He studied particle physics as a graduate student at Tokyo University, Japan's top school, where his copious note taking made him popular among classmates. Toyoda was relatively outgoing. Before joining the cult, he entertained his fellow lab rats with a mean impersonation of Shoko Asahara during Aum's 1990 election campaign. The guru had the last laugh. Toyoda was converted to Aum by another Tokyo University student and, in the spring of 1992, signed up.

On the morning of March 20, 1995, these five Aum members blended with the rush-hour crowds in Tokyo's subways. The cultists boarded five trains at different ends of the vast network. They knew the exact times and locations for each train and each station. They also knew that by 8:15 a.m., all five trains would converge upon Kasumigaseki, the center of power in Japan, home to the bureaucracies that rule more than 125 million Japanese.

It was here that Aum's high-tech terrorists would strike their preemptive blow – to paralyze the Japanese state and begin the cult's historic mission of world domination. Police were threatening to raid cult facilities, leaving Aum no choice but to attack first.

By 7:45 a.m., each member of the hit squad sat in his designated train, clutching a cheap umbrella and a package of sarin wrapped in newspaper. A few stops from Kasumigaseki, the cultists laid their bags on the car floors and punctured them with the umbrella tips. Then, as the car doors opened, they

184 ▶

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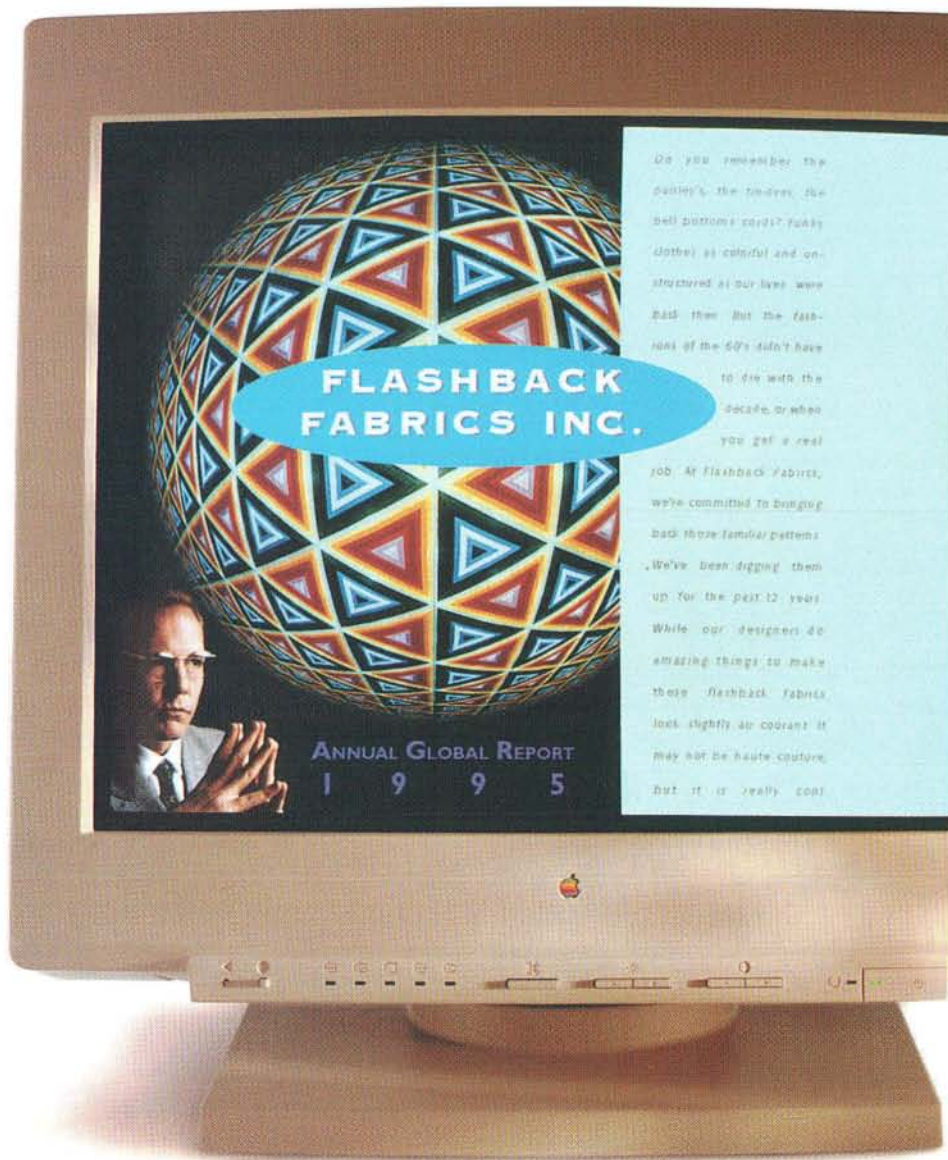


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Aum

◀ 182 darted into crowds and out of the station, where getaway cars waited.

Only one cultist seemed aware of the carnage ahead. Aum physician Hayashi was standing on the Chiyoda line platform. The doctor was having a last-minute fit of morals. He looked around and saw a young girl waiting in line behind him. *Go away, he thought. If you get on here, you'll die.*

The train pulled up. Dr. Hayashi boarded the first car, as instructed, and sat close to the door. He caught the eye of a woman in her 30s and quickly looked away. *You too will be dead soon*, he thought. His sarin package was wrapped in two newspapers: *Red Flag*, the Japanese Communist Party daily, and *Seikyo Shimbun*, published by a rival religious group. Dr. Hayashi hoped the choice of reading would later throw police off.

His station was announced over the intercom, and the train slowed with a lurch of brakes. Kasumigaseki was now four stops

ing panic inside the cars reached critical mass. Passengers tumbled from the train, gagging and vomiting, clutching handkerchiefs across their faces, gasping for breath. Five collapsed on the platform, foaming at the mouth. Three others lay inside the car, their bodies jerking violently. As commuters staggered toward the exits with pinhole vision and crashing headaches, an announcement echoed across the station: "Evacuate, evacuate, evacuate."

Above ground it was pandemonium. Pavements and roads were blanketed with casualties. The victims were eerily quiet – the nerve gas had crippled their lungs and stolen their voices. Soon ambulance sirens cut through the silence, and TV helicopters throbbed overhead. Even as police tried to work out what had happened, more reports were coming in. Another subway line had been hit ... and another, and another.

Soon, wave after wave of blind, disoriented victims flooded nearby hospitals, baffling doctors with their symptoms. Meanwhile,

warns terrorism expert Bruce Hoffman. "This is the cutting edge of high-tech terrorism for the year 2000 and beyond. It's the nightmare scenario that people have quietly talked about for years coming true."

In the weeks following Aum's subway attack, terrorists in Chile and the Philippines threatened to unleash their own chemical arms. In America, Ohio traffic cops pulled over an outspoken white supremacist and found three vials of the bacteria that cause bubonic plague. Meanwhile, two members of the Minnesota Patriots Council – one of scores of heavily armed US militia groups – were convicted of planning to use ricin, a biological toxin, to kill federal agents. The trial was a sign of the times: the men were the first convicted under a 1989 US law, the Biological Weapons Anti-Terrorism Act.

It would be easy to dismiss Aum as a peculiarly Japanese case, and indeed, there are conditions in Japan that shaped the cult's unique character. The straitjacket schools and workplaces, the absentee fathers and alienated youth no doubt helped fuel Shoko Asahara's rise to power. But to suggest that what happened in Japan could not happen elsewhere would be a dangerous mistake. Ineffective and bungling police, fanatic sects, and disaffected scientists are hardly limited to the Japanese.

Aum's forays into conventional weapons – its explosives and AK-74s – were alarming enough, as were the cult's eerie experiments with electrodes, drugs, and mind control. But where Asahara and his mad scientists charted new ground was in their pursuit of the weapons of mass destruction. This, unfortunately, will prove Aum Supreme Truth's lasting legacy: to be the first independent group, without state patronage or protection, to produce biochemical weapons on a major scale. Never before had a subnational group gained access to so deadly an arsenal.

The word is out. A college education, some basic lab equipment, recipes downloaded from the Internet – for the first time, ordinary people can create extraordinary weapons. Technology and training have simply become too widespread, too decentralized to stop a coming era of do-it-yourself machines for mass murder. We are reaching a new stage in terror, in which the most fanatic and unstable among us can acquire the most powerful weapons. ■ ■ ■

This is the cutting edge of high-tech terrorism for the year 2000 and beyond. We've definitely crossed a threshold.

away. Dr. Hayashi placed the package at his feet and stuck the umbrella in several times. He felt one of the bags rupture, but wasn't sure about the second one. He wasn't waiting around to find out.

By 8:10 a.m., Dr. Hayashi and the four other cultists were back on the street, looking for their drivers. Soon after, the cars were nudging through morning traffic, heading back to the hideout. In the tunnels below, 11 bags of nerve agent on five subway cars thundered toward the city center, along with thousands of unlucky commuters.

Within minutes, the air in the cars was thick with choking, invisible fumes, and passengers were groaning with nausea. On one train, a man kicked the offensive package onto the platform when the doors opened, but not before two commuters collapsed on the ground, their bodies shuddering with spasms. Incredibly, the train did not stop, but pulled out a minute later, bang on time. It would make two more stops until the grow-

Tokyo's brutally efficient subway continued to spread Aum's killer chemical. One train passed through Kasumigaseki *three times* before its deadly cargo was discovered.

By the time the subway system finally ground to a halt, the whole nation reeled at the news. The death toll eventually climbed to 12. More than 5,500 were afflicted, many with appalling injuries. At least two passengers now slept eternally in vegetative comas. One woman was admitted to a hospital in agony after the nerve agent had fused her contact lenses to her eyeballs. In the end, she had both eyes surgically removed.

PREVIEW OF THE 21ST CENTURY?

A psychopathic band of brilliant scientists, bent on indiscriminate murder and the world's end – Aum's story seems more at home in the world of science fiction novels and TV thrillers. Yet it happened in real life. More frightening still, it will happen again.

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Books of choice: Isaac Asimov, *Foundation*; John Berger, *Ways of Seeing*; Roald Dahl, *James and the Giant Peach*; Jack London, *White Fang*; Tim O'Brien, *The Things They Carried*; Mervyn Peake, *Titus Groan*; Morihei Ueshiba, *The Art of Peace*; David Foster Wallace, *Infinite Jest*.

Drug of choice: PEZ from lamb head dispenser.

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THE NETIZEN

◀ 52 allowed themselves to get trapped in the day-to-day step work. I think Newt himself has his head down, and he has been punished by his own party for his willingness to contemplate the kinds of future changes that are essential. The system punishes anybody who talks about the future. The system says, "You're here to produce instant results for whoever the recipient might be, whether it's the public or some lobby." It's now clear the system

is geared for immediate reaction to immediate pressures.

That's a very depressing thought. What would you suggest the readers of *Wired* do in the interim?

I think the readers of *Wired* are a unique resource for the country. I think we need discussions of alternative political forms on the Net and elsewhere. We need a repertoire of ideas; we need years, not months, of discussion and debate

about alternative political structures that become possible in today's world, and transitional steps that might move us in the right directions. And we need to do that in a framework in which the one prohibition is the prohibition of fanaticism. We don't need passionate commitments to this or that form, because it's way too early. I don't care how smart anybody on the Net is - nobody has all the answers. What we're talking about is such a tremendous leap in the history of governance that there's no single architect, there's no brain that knows the answers to how to do it. We need to take advantage of millions of brains. We need the distributed intelligence in the system for this.

Well, if you want primarily discussion with no action, that's what the Internet is all about.

I believe that's the stage we're at.

My worry is, how do you get people to stop discussing things and actually try something?

We have powerful forces here. First of all, we've got Third Wave industry. We've got

the companies that have a vested interest in advancing the whole move toward an information-based economy. Second, we have all the millions of very smart people on the Net. I think what you want are invisible colleges. And we need to come up with an agenda. That agenda can't be 342 points. It has to be 10 points; that's about as much as we can handle.

Will people who are not on the Net, who are not wired, be opposed to the changes Third Wavers want?

No. Because it isn't just a question of communications and computers. It has to do with institutional structure, decentralization of politics, and a bunch of other issues. De-bureaucratization affects everybody, whether you're on the Net or not. **Will the digital community be able to get what it wants?**

I think there's a utopian stream that's going to be quite disappointed when everything shakes out. I mean, not all information on the Net will be free.

Moreover, there is a kind of anticorporate, antibusiness extreme within the digital community that sees business as the enemy. And that is just misguided.

Won't large businesses be affected by the same forces that are downsizing the political landscape?

I believe that microtrade and microcapital are the key elements of the future economy. What the Net implies is that it will be possible for a village in Cambodia to find a tiny crevice of a market in a suburb of Keokuk, Iowa, say, for something that may not be produced anywhere else in the world. The Net will make millions of those kinds of connections possible.

Do you really think the world will become sympathetic to these ideas?

Oh, these ideas are regarded now as zany, kooky, but I believe that in 10, 15 years, as the entire Internet phenomenon spreads, as more and more young people come into the system, these proposals are going to become mainstream proposals. They're not just going to be regarded as these flaky, digerati ideas. ■ ■ ■

Message 37:
 Date: 7.1.96
 From: <nicholas@media.mit.edu>
 To: <lr@wired.com>
 Subject:

The Media Lab's Michael Bove believes that a television set should be more like a movie set. But movies require locations, actors, budgets, scripts, producers, and directors. What would it mean, Bove wonders, if your TV worked with sets instead of scan lines?

Sets and actors

For too long, TV has taken its lead from photography, which collapses the three-dimensional world onto a plane. Except for the image-sensing mechanism attached to the back, today's TV camera is very similar to a Renaissance camera obscura. This longstanding construct is perhaps the wrong way to think about television. Maybe there is a way to capture the scene as a collection of objects moving in three dimensions versus capturing a single viewpoint on the

Object-Oriented Television

space so that on playback we can resynthesize the speaker to correspond with the arrangement of things on the screen and the viewer's path through them.

The bit budget

TV is a bandwidth pig. Ten years ago, a common assumption was that 45 million bits per second were needed to obtain studio-quality television. Today, that level of performance is possible at 4 million bps. That's quite an improvement, but compared with the 29,000 bps you get when connecting to the Internet (if you're lucky), we still have a long way to go.

There is one fundamental reason for this profligate use of bandwidth. TV receivers are dumb – in particular, they are forgetful. On a per-cubic-inch basis, your microwave

We need a flexible decoder capable of interpreting whatever the originator (or an automatic process) decides is the best way to encode a given scene. For example, it would be more efficient (and legible!) to transmit the fine print during car-lease commercials as PostScript (a common standard for typography and printers) instead of MPEG. Your TV's decoding capabilities might be updated as often as your PC's Web browser is now. Perhaps TV viewers in the next decade will eagerly look forward to September as the month when the next season's algorithms get downloaded.

Storytelling

Having actors and sets hang around in our TVs isn't going to do us a lot of good unless we can tell them to do something interesting. So, in addition to objects, we need a script that tells the receiver what to do with the objects in order to tell a story.

TV conceived as objects and scripts can be very responsive. Consider hyperlinked TV, in which touching an athlete produces relevant statistics, or touching an actor reveals that his necktie is on sale this week. Bits that contain more information about pixels than their color – that tell them how to behave and where to look for further instruction – can be embedded.

These bits-about-the-bits will resolve a problem that has beleaguered Hollywood directors faced with one-version-fits-all screens and made them envious of graphic designers, who can design postage stamps, magazine ads, and highway billboards using different rules of visual organization. Television programs could react according to the originator's intention when viewed under different circumstances (for instance, more close-ups and cuts on a small screen).

You think Java is important – wait until we have a similar language for storytelling. TV is, after all, an entertainment medium. Its technology will be judged by the richness of the connection between creator and viewer. As Bran Ferren of Disney has said, "We need dialog lines, not scan lines." ■ ■ ■

This article was co-authored by V. Michael Bove (vmb@media.mit.edu), Alexander Dreyfoos Career Development professor at MIT's Media Lab.

Next Issue: Building Better Backchannels

**What we need is "real virtuality,"
 the ability to point a computer
 or camera at something and later
 look at it from any point of view.**



scene. Think of it as a computer graphics process, more like *Toy Story* than *Seinfeld*.

The networked virtual reality language VRML has such a model behind it. But it's difficult to author good virtual worlds from thin air, so there aren't any out there on the Web that are as funny as *Seinfeld* or as appealing to the public as college basketball. What we need is "real virtuality," the ability to point a computer or camera at something and later look at it from any point of view.

This is particularly important to Hollywood, because most of the cost of a movie is in front of the camera, not behind it. Object-oriented television should cost less both in front and behind, and not look cartoonlike. It will still involve cameras, but instead of giving the postproduction people (or the viewers of an interactive program) a switch that flips between cameras one and two, these cameras will contribute what they observe to a database from which any viewpoint can be constructed.

Similarly, TV sound should be object-oriented. Instead of left and right channels, sound can be represented as individual sound sources in an acoustically modeled

oven may be smarter. A TV set is spoon-fed pixels – line by line, frame by frame. Even if you compress them by taking out the enormous redundancy that occurs within and between frames and by taking advantage of the characteristics of human vision, video as we know it still uses many more bits than a computer graphics database capable of synthesizing the same images.

Inefficiency also results from a lack of memory. Your TV doesn't remember that the set of the local news changes only about once every three years, it doesn't remember the architecture of sports arenas, and it doesn't remember the Steve Forbes commercials seen six times each hour by those of us living in states holding early primaries.

The digital TV sets about to hit the market are able to do a lot more multiplications per second than your microwave oven, but they still aren't "clever." They decode a closed-form standard, known as MPEG-2 (derived from the Motion Picture Experts Group). MPEG-2 may be among the last standards for which anyone bothers to develop a dedicated chip. Why? Because a single data standard for digital video, one that is always best, just does not exist.



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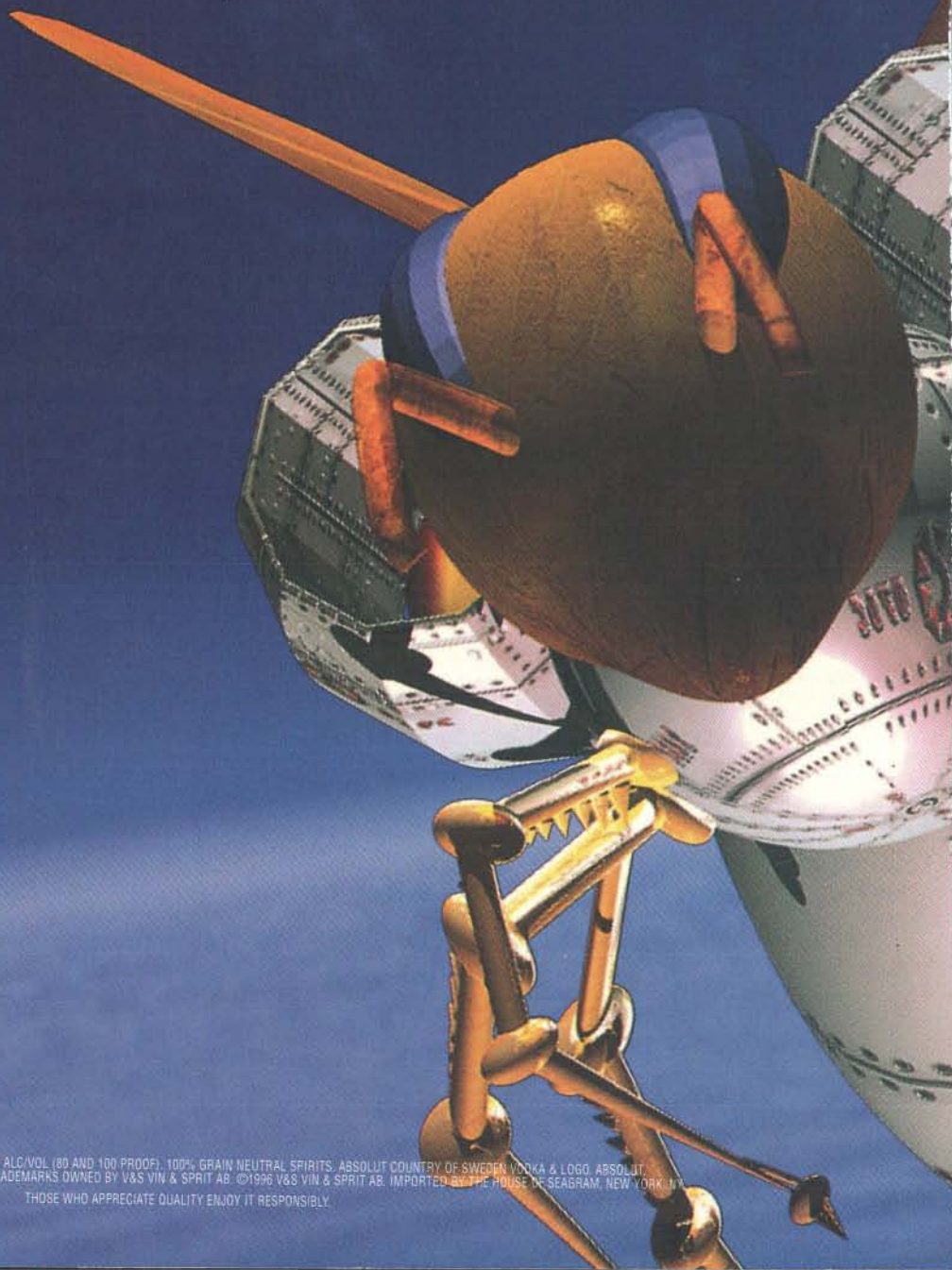


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